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ART. XXX.—OBSERVATIONS ON THE FRUIT OF DIOSPYROS
VIRGINIANA.

BY BENJAMIN R. SMITH.

(Extracted from an Inaugural Essay.)

(1.) A quantity of persimmons gathered toward the latter end of August, were beaten to a pulp and treated with water, the solution was filtered in order to render it perfectly clear. To separate portions of the liquor, solutions of gelatin, sulphate of quinia and sub-acetate of lead were added; they all caused copious, white, flocculent precipitates. The precipitate with lead was thrown on a filter, and in the course of half an hour passed through all the changes, from white to a dark orange, and finally to a deep brownish black. A solution of sulphate of iron coloured the infusion a deep purple. Both nitric and sulphuric acids threw down precipitates, the former of a dirty orange colour, the latter white. After the infusion had been submitted to the action of sub-acetate of lead, and filtered, a solution of gelatin had no effect on the filtered liquor, and sub-acetate of lead had no effect on the liquid filtered from a precipitate with gelatin, so that whatever be the principle to which the persimmon owes its astringency, these

experiments clearly prove that both lead and gelatin combine with the whole of it, and with all, should there be more than one. Upon evaporating the liquid after precipitation with gelatin, a saccharine mass was left, which was not crystallized by evaporation in a drying room; this sugar was treated with sulphuric acid, which dissolved the whole of it. Some of the persimmons were boiled in water and tested for starch, but without effect. Alcohol had no effect on the aqueous infusion of persimmon. The residue from the infusion had all the characters of lignin.

(2.) A quantity of green persimmons gathered in September, were digested in alcohol, till all the matter soluble in that menstruum was taken up. The residue was boiled in water for some minutes, and tested for starch, but without effect; the tincture was very astringent, and exhibited all the properties noticed in the aqueous infusion; it was not clouded by the addition of water. This tincture was submitted to spontaneous evaporation; after standing for some days it was converted into a thick jelly, which was slightly astringent, but very sweet; it was evaporated to dryness, when it entirely lost its astringency. This substance was boiled in alcohol, which dissolved a part of it; this being evaporated, proved to be the saccharine mass spoken of above. A solution of sulphate of iron turned a solution of this sugar slightly purple, and sub-acetate of lead threw down a slight precipitate. The remaining solid resembled resin in its appearance; it was insoluble in boiling water and alcohol, and but very slightly soluble in boiling spirits of turpentine. A portion of this substance was submitted to the action of heat in a test tube; it did not blaze, but burned away evolving much smoke, and with a disagreeable smell like the burning of vegetable oils; 13 grs. of carbon were left after burning 60 grs. of this substance. The residue left when the tincture was filtered was boiled in water, and the water evaporated; after standing a day, crystals were formed on the sides of the dish. A solution of

baryta precipitated a solution of these crystals, and as neither nitric nor muriatic acids decomposed the precipitate, the salt was inferred to be a sulphate, and from the taste, and the fact of its decrepitating in the flame of a lamp, it was supposed to be a sulphate of potassa.

From 600 grs. of green persimmon, freshly gathered, there was obtained :

Of insoluble resinous matter - - - -	119 grs.
" saccharine matter, slightly acid - -	64 "
" ligneous matter - - - - -	22 "
" green coloring matter - - - - -	1 "
	<hr/>
	206 "

leaving a loss of 394 grs., which was no doubt water, for the persimmons were very juicy. A portion of the saccharine matter was exposed to the air for a few days, when it became quite acid, and lost its sweetness in a great measure ; a solution was made, and sub-acetate of lead added ; a precipitate was formed, which after standing for some time lost its amorphous character, and was converted into groups of crystalline needles ; a solution of sulphate of iron changed the solution to a brown colour. These experiments indicated malic acid, which may have been derived from the sugar ; which, if true, is an interesting metamorphosis, and deserves a more attentive examination than I have been able to give it at this time.

In the first of these experiments, we find the infusion of persimmons precipitated by solutions of sub-acetate of lead, sulphate of quinia, gelatin, and sulphuric and nitric acids. Solution of sub-acetate of lead yields precipitates with almost all the organic acids, with gum, albumen, and caseous matter. Solution of sulphate of quinia causes a precipitate with tannin. Sulphuric acid forms a white sulphate, and nitric acid a dirty orange coloured nitrate of tannin. Sulphate of iron gives a purplish black colour to a solution

of tannin, such as is obtained from the oak bark. The precipitate with sub-acetate of lead, after standing for some time, changed its colour from white to orange, and then to dark brown, and this is particularly mentioned by Berzelius to be a property of the tannate of lead, and the certain test for this substance is the solution of gelatin, which is dissolved by most of the weak acids, but which precipitates tannin. The astringent matter of the persimmon is therefore inferred to be tannin, and tannin analogous to that of the oak bark, and not modified tannin, and it is also supposed that at this period of its growth tannin is the only active substance in the persimmon besides a trace of malic acid. The insoluble substance left after the evaporation of the tincture, is probably the apotheme which is formed when nearly all of the tinctures or infusions of vegetable astringents are exposed to the influence of the air; it agrees entirely in its properties with the description of apotheme which is given by Berzelius. There is neither starch, gum, nor resin, in the fruit.

(3.) A month after the last experiments a tincture was made of some freshly gathered persimmons; they were by this time about an inch in diameter; the colour was changing from a deep green to a light red; they were full of juice, very sweet, and excessively astringent. They contained all the substances found in those before experimented upon, but neither starch nor gum.

(4.) Some persimmons were gathered, as ripe as could be obtained, and after having been exposed to the frost, they were of a rich salmon colour, very sweet and juicy, and had entirely lost their astringency; 680 grs. of these persimmons were submitted to the action of alcohol; the tincture was filtered and evaporated; during the evaporation it did not become gelatinous, as in the former experiments, but thickened at once to a syrup, and was dried to the consistence of an extract; it was the same as the saccharine matter obtained before, analogous to grape sugar, and weighed

113 grains. The whole was completely soluble in water, and did not contain a trace of apotheme. The residue left when the tincture was filtered was now examined, and found to consist of ligneous matter, completely enveloped in a gelatinous mass; this was submitted to the action of a solution of caustic potassa; the liquor was immediately coloured deeply brown, almost black; after dissolving all the soluble matter, it was filtered and neutralized with nitric acid, which rendered the solution nearly colourless, and threw down a copious precipitate; this was dried, and weighed 18 grains. The remainder was ligneous matter, and when dry weighed 11 grains.

In all the former experiments there was found to be a considerable quantity of tannin in the persimmon; and when the tinctures were evaporated, the tannin, all of which had been dissolved by alcohol, was changed into an insoluble apotheme; but in the last experiment there was not a trace of tannin in the persimmon, nor yet of apotheme formed from the tinctures, but it was left with the lignin when the tincture was filtered; that this was apotheme, was inferred from the colour and general appearance, from the brown colour which it caused in a solution of caustic potassa, and from its precipitating, when the solution is neutralized by an acid, all of which are mentioned by Berzelius as being characteristics of apotheme. The apotheme from this experiment weighed 18 grains, which is nearly three per cent. on the persimmon employed. In a former experiment the apotheme was five per cent., so that the tannin is partially converted into sugar, but three-fifths of it is formed into apotheme and remains as such in the ripe fruit. There was also a considerable diminution in the quantity of lignin as compared with a former experiment, in which it was found to form one-twenty-seventh of the whole fruit; but in the last experiment it was only one-fifty-fourth. Now it is supposed that in the young fruit lignin serves as a sort of frame-work, and is a means of circulation for the juices of

the plant; but as the fruit ripens the lignin is converted into sugar, 20 parts of lignin producing 21 parts of sugar. The lignin which was missing in the last experiment would produce $13\frac{1}{2}$ grains of sugar. In experiment fourth, the sugar was about one-fifth of the persimmon employed. In experiment third, it was rather more than one-ninth. Judging, then, from this experiment, one might suppose that in experiment fourth the sugar would be rather more than 82 grains, instead of which it weighed 113 grains; $13\frac{1}{2}$ grains were produced from the lignin, making, when added to 82, 95 grains; the other 18 grains might have been formed from the two-fifths of tannin which was not formed into apotheme. The dried fruit strongly resembles the date in its taste, but an insoluble substance is very plainly perceived.

It seems to be a general opinion that a frost is necessary to perfect the fruit of the persimmon; the opinion, however, is not entirely correct; for in the West Indies the persimmon tree bears two crops, and both are ripened without the aid of frost, and I have in one instance seen the fruit perfectly ripe some days before any frost was felt. It is certain, however, that the cold has considerable influence in rendering them edible. An experiment was made in order to ascertain the cause of this. A tincture of kino was subjected to the action of the atmosphere on a cold frosty night; in the course of a few hours it was found to be almost entirely converted into an apotheme; but a portion of the tincture enclosed in a bottle and exposed to the cold, did not undergo any alteration in its character; so that it appears that the atmosphere, and not the temperature, effects this change. The persimmons which remain on the trees are not near so fine as those which fall to the ground, and indeed in many instances the fruit remains on the trees till the return of spring, and is then found to be quite astringent. It appears probable, then, that the cold acts by destroying the connection between the calyx and the stem

of the tree, and the fruit already mellow falls to the ground and is broken by its fall; the exposure of the pulp to the oxygen of the atmosphere for a few hours, would convert the tannin into an apotheme, and render the fruit edible.

From these experiments it might be concluded that when in a green state the persimmon contains little else than ligneous matter, tannin, sugar, a little malic acid and colouring matter, but neither gum, starch, resin, nor pectin. That as the fruit undergoes the process of ripening sugar increases in quantity, and both the juice of the fruit and malic acid are found more abundantly, but the tannin is decreasing. When the fruit has arrived at maturity the juices abound, lignin is in smaller quantity, and the tannin, instead of being converted into sugar, is in great part formed into an apotheme, and remains as such in the ripe fruit. The ripe fruit, if left to the action of the air, undergoes the acetous fermentation, and suffers decay.

ART. XXXI.—ON THE ETHEREAL EXTRACT OF CUBEBS.

By WILLIAM PROCTER, JR.

M. SOUBEIRAN (*Traité de Pharmacie*, tom. ii. p. 48) gives a formula for making what is called "Oleo-resinous Extract of Cubebs," as suggested by M. Dublanc, and is as follows: Six pounds of Cubebs are directed to be distilled with twenty-four pints of water, the oil separated and set aside; the distilled water is returned to the still with six additional pounds of Cubebs, and again distilled, and the oil mixed with that of the preceding operation. The residue in the still is strongly expressed and then exhausted by alcohol of

36° Baumé, the alcohol removed from the tincture by distillation, and the residue evaporated to the consistency of honey; about twelve ounces of extract is thus obtained, which, when mixed with the volatile oil, is completed.

This is undoubtedly a good preparation, but the complexity of the process used in obtaining it is objectionable.

In the analysis of Cubebs by Monheim, he found the following ingredients in 1000 parts:

Waxy matter,	30 parts.
Cubebin	45 "
Green volatile oil	15 "
Yellow volatile oil	10 "
Balsamic resin	15 "
Extractive	60 "
Lignin	650 "

In treating Cubebs by the process of Dublanc, the product contains all the cubebin and resin, most of the volatile oil, except that dissolved in the water, a part of the extractive and waxy matter; hence it is deficient in the most essential part, the volatile oil.

When pulverized Cubebs is treated directly by ether in a displacement filter until exhausted, and the ethereal tincture distilled carefully in a water-bath, the residue has a homogeneous consistence, about that of copaiba, a dark olive brown colour, transparent after the deposition of a small quantity of waxy matter, and possesses the odour, taste, and active properties of the drug in a marked degree. This substance consists of all the volatile oil, cubebin, and resin, most of the waxy matter, none of the extractive, and hence embraces all the active principles of the plant, to the exclusion, if we except the waxy matter, of those that are inactive. It is a true oleo-resin, and preserves its fluidity until the volatile oil is evaporated by a considerable temperature. Dr. Goddard, at whose request this ethereal extract was made, has found its therapeutical effects to fully answer his expectations, and feels assured that the drug is

faithfully represented by the preparation. For the guidance of those who may be inclined to make this oleo-resin for medical use, I subjoin a formula: Take Cubebs in powder one pound avoirdupois, and sulphuric ether a sufficient quantity, which is two and a half to three pounds; introduce the powder into a displacer, insert the lower end in a bottle that fits it, add the ether carefully, and cover the top of the filter with a piece of wet bladder, through which several pin holes are made. The flow should be very gradual, and if too rapid the orifice of the filter should be partially closed with a cork—by attention to this point much less ether will be required. The ethereal tincture should be introduced into a large retort, heated by a water-bath, and the receiver well refrigerated. The distillation should not be hurried towards the last. When five-sixths of the ether has passed, it should be separated for use, and the evaporation continued in the retort, observing to keep the temperature below 120° Fahr., so as not to volatilize the essential oil. The product in the retort amounts to two ounces, just one-eighth of the Cubebs used.

This preparation may be administered in emulsion, pills, or in capsules; one drachm representing an ounce of the Cubebs.

R Oleo-resinæ Cubebæ,	℥ij.
Pulveris Acaciæ	℥ss.
Sacchari,	℥j.
Aquæ	℥iiiss.

M. ft. emulsio.

A table spoonful of this emulsion represents two drachms of Cubebs. Should it be desirable to use alum with it, it may be dissolved in the water.

The most complete mode of administering this substance is in gelatin capsules, like those of copaiba, and it was in this form that Dr. Goddard employed it.

ART. XXXII—IODIDE OF IRON OBTAINED BY DOUBLE DECOMPOSITION.

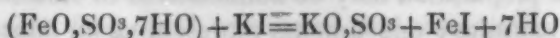
Extracted from a Memoir on Iodide of Iron, by M. Ch. Calloud.

By reducing iodide of potassium and sulphate of the protoxide of iron into fine powder, and triturating the mixture of the two salts, I have obtained proto-iodide of iron:

1 equiv. sulphate of the protoxide of iron	139.1
1 “ iodide of potassium	165.45

The mixture of the two salts, well pulverized, is triturated for a short time in an iron mortar; the double decomposition which is effected by the aid of the water of crystallization of the sulphate of iron, is known to be complete when the saline mixture has become humid; it is then treated by alcohol 36° Baumé, which dissolves only the proto-iodide of iron formed.

When the reaction is entirely effected, the sulphate of potassa is left in the condition of an insoluble salt, whence the following formula can be established:



Analysis.—The alcoholic solution of proto-iodide of iron by double decomposition is lightly greenish, has a styptic ferruginous taste, but not at all bitter or acrid. Diluted with water, it is not precipitated by nitrate of baryta. Exposed to the air, it behaves in the same manner as solutions of the proto-salts of iron, to wit: it becomes colored *yellow*, afterwards *brown*, forms an ochreous deposit of sesquioxide, or basic salt, at the same time that the presence of *free iodine* becomes evident.

Hydrate of potassa gives a precipitate of protoxide of iron, which being brought to the state of sesquioxide, corresponds with the proportion of iodide of iron produced.

Iodide of potassium, reconstituted from it, represents the quantity employed, except a slight loss.

These points well established, it is with much confidence that I propose the therapeutic employment of the protiodide of iron, mixed with sulphate of potassa. It presents the incontestible advantage of being found in a dry state without any alteration.

The following formula can serve for pharmaceutical preparations, having a base of iodide of iron :

Sulphate of protoxide of iron,	-	-	3 parts.
Iodide of potassium,	-	-	4 "

It is important to choose the sulphate of iron, in little almost colourless translucent crystals, which are constituted with seven equivalents of water of crystallization. The iodide of potassium ought also to be perfectly neutral and pure; the least alkalinity of the iodide will be discovered by the sulphate of iron, which in this case is a good test. For to be certain of the purity of the materials, the mixture of the two salts well pulverised, dissolved in a small quantity of water, ought not to be troubled by oxide of iron, either green or yellow, as the first indicates the basic character of the iodide of potassium, and the second that the sulphate of iron was partly sesquioxidised.

Pills of Proto-iodide of Iron.

R. Crystallized sulphate of iron,	-	-	24.7 grs.
Iodide of potassium,	-	-	32.4 "
Gum tragacanth,	-	-	4.6 "
Sugar,	-	-	15.4 "
Syrup and powder of marshmallow, q. s., for making 36 pills.			

Each pill contains .8 of a grain of dry iodide, of iron, or 1.09 of the hydrated salt, and .4 grain of sulphate of potassa.

The sulphate of iron is at first reduced to very fine powder in an iron mortar, afterwards the iodide of potassium, and then triturate the mixture to facilitate the reaction of the

two salts; then add the gum, the sugar, the syrup, and, if necessary, the powder of marshmallow.*

To preserve these pills from the action of the air, it will be well to cover them with gelatin by the process of M. Garot. But this manipulation requires too much time to render it practicable for small quantities.

A mass which is readily preserved, is obtained by replacing the syrup and gum of the formula by 30 grains of crum of bread.

The water of the bread liquifies remarkably the sugar and salt, the powder of marshmallow is added to give the mass the necessary consistence. The gluten and soluble amidon of the bread form a varnish, which, by hardening, circumscribes the action of the air to the surface of each pill.

These pills are rolled in lycopodium and placed in a very dry place.

The following preparations can replace those described in the formularies:

Tincture of Proto-iodide of Iron.

R. Sulphate of iron,	- - -	8 parts.
Iodide of potassium,	- - -	10.5 "
Alcohol 36° Baume,	- - -	160 "

The two salts are triturated, as before described, the proto-iodide of iron dissolved by means of the alcohol, and filtered.

It is preserved in glass stoppered vials which should be exactly filled with the tincture. A slight excess of the iodide of potassium gives it more stability.

This tincture contains about one part of iodide of iron in 16 parts.

* A formula for pills of iodide of iron by our colleague, Henry W. Worthington, was published in vol. 15th, p. 71. of this journal, in which he evaporates a concentrated solution of the ferruginous iodide made by the process of the Pharmacopœia with honey and tragacanth to a pilular consistence. The honey preserves the iodide from oxidation during the evaporation, but renders the pills too deliquescent to keep in boxes.—W. P. Jr.

Wine of Iodide of Iron.

R. Sulphate of iron,	-	-	-	8 parts.
Iodide of potassium,	-	-	-	10.5 "
White wine,	-	-	-	320. "

The two salts are pulverised, a few drops of wine added to the mixture to assist the reaction, triturate for a few moments, add the rest of the wine, and filter.

Thirty-two parts of this wine contain one of the ferruginous iodide, besides a little sulphate of potassa.

This wine should be kept in glass stopped vials, nearly filled, or in vials stopped with corks which have had their tannin saturated with proto-sulphate of iron, and washed.

The formula of Dr. Pierquin requires Bordeaux wine for the menstruum, but the tannin which exists in it in considerable proportion acts on the ferruginous salt, and I think it is preferable to substitute the white wine.

All the preparations having a base of iodide of iron obtained by double decomposition being very easily and quickly made, it is not necessary to prepare them in advance, but every time they are demanded on prescription.

NOTE.—The above method of M. Calloud, (extracted from his memoir in the *Journal de Pharmacie et de Chimie*,) for obtaining iodide of iron by double decomposition is particularly advantageous for its prescription in pills. The commercial iodide of iron almost always contains free iodine, and sometimes in such excess that its administration in pills would be highly irritating to the stomach, and altogether improper, and this is the case with iodide prepared very carefully, unless kept absolutely hermetically sealed. The sulphate of potassa is almost inert in the quantity resulting and may be looked upon as a means of giving consistence to the pills.

A syrup of iodide of iron may be made extemporaneously, perfectly free from free iodine, and containing the offic

nal quantity of dry iodide of iron by the following formula, viz :

R. Proto-sulphate of iron, (pure,) - - -	3iss.
Iodide of potassium, - - -	3ij
Water, - - -	3ss.
Simple syrup, - - -	3iss.

Rub the salts intimately together, dissolve them in the water, add the syrup, and bottle immediately. This preparation has a slightly greenish colour, and contains about 56 grs. of dry iodide of iron, and 27 grs. of sulphate of potassa. The great readiness with which this syrup is made, and the control the physician can exert over the strength of it, renders it in many respects an eligible formula.

W. P. jr.

ART. XXXIII—EXAMINATION OF PIPER ANGUSTIFOLIUM, OR MATICO.

By THOMAS S. WIEGAND.

At the suggestion of Dr. Ruschenberger of the U. S. Navy, who first called the attention of the Medical profession of this country to the article under consideration, the following experiments were undertaken, to learn what the composition of the plant is, and to ascertain whether the more active constituents might be separated and applied with more of advantage or convenience.

This plant has been the subject of several papers in the American Journal of Pharmacy, one of which states that it is valuable as a remedy in diseases of the genital organs and rectum, and that the natives use this plant for similar purposes : the last assertion is probably incorrect, for from information received by Dr. R. from Dr. J. H. Scrivener, who was practising medicine at Lima in April, 1845, it appears that, so far as could be learned from the druggists

there, no preparation of it was used internally, its employment being limited to the arrest of hæmorrhages and the treatment of ulcers.

His paper, which is short, is very much to my purpose, and containing, as it does, all the authentic information upon its commercial history and use among the Peruvians, needs no apology for its entire transfer.

"Matico. This plant grows abundantly along the sides of the mountains of Menobamba and Huanuco in the department of Junin.

"There are three species of this plant which are known by their stems, that are of a red, brown and white colour; the red species is considered superior to others, and is brought to Lima in large quantities and sold to the druggists.

The discovery of the properties of this plant is assigned to a soldier, who, being attacked by a violent hæmorrhage from a wound he received in the battle of Ayacucho, applied (for the want of other resources) the leaves of it to his wound, and found to his great astonishment that it immediately ceased.

"An account of this plant is to be found in the Flora Peruvianna, under the botanical name of *Piperomia*, which contains several species, but no mention whatever is made of its medicinal properties, probably unknown at that period.

"This plant is very generally used in Lima and along the coast in cases of hæmorrhages and all kinds of ulcers.

"The following is the formula observed there in hæmorrhages.

"The leaves are well pounded and then applied to the wound, which occasions a contraction of its vessels and consequently a cessation of the hæmorrhage.

"An infusion of this plant is used as a wash in ulcers, after which a small quantity of the powder is applied which produces a crop of healthy granulations.

"I am not aware that any preparation of it has been used internally; if such had been the case, I should have heard of

it from the druggists, of whom I have made particular inquiries.

"I have no doubt that a remedy possessing such important properties as the Matico in the case of hæmorrhages and ulcers might be administered internally with benefit in cutaneous diseases."

Lima, April 30th, 1845.

1st. A decoction of the leaves previously broken up was made, and to this Tinct. Iodine was added without producing any further change than that of adding its own colour to the decoction, thus showing the absence of starch.

2d. An infusion was made by displacing with water an ounce of the leaves, previously treated with æther to remove the matters soluble in that menstruum; to a portion of the infusion thus obtained liquor plumbi subacetatis was added, till a precipitate was no longer occasioned by it; the result was a copious flocculent precipitate, giving evidence of a considerable quantity of gummy matter.

3d. A quantity of the leaves previously broken up was placed in a copper still and covered with water; this was then boiled strongly, and the water, which at first came over clear, speedily assumed a milky appearance, and upon its surface streaks of a greasy aspect were seen—the water was returned to the still, and the oil, which came over, having subsided to the bottom of the recipient, was collected, the quantity obtained from 7 lbs. troy, was about 11 drachms; the most remarkable peculiarity of the oil is its great density. Its specific gravity being 1.12, its colour is a full yellow, and in quantity it has a slightly reddish tint, quite fluid, and of course possessed of the odour and warm taste of the leaves in a high degree; when placed on the tongue it causes a hot pungent taste, very persistent, as might be expected from one of this tribe of plants; it is freely soluble in alcohol and sulphuric æther; its odour is completely sui generis. When most of the experiments detailed in this paper had been finished, my attention was directed to some

observations on the Pharmaceutical and Chemical character of the Peruvian Matico, by John F. Hodges, M. D. He describes the oil to be of a light green colour, and, when freshly procured, of the consistence of good castor oil, becoming crystalline upon standing, and reddened by sulphuric acid.

Desiring to know whether the oil was at all soluble in water, a drop was placed in an ounce of distilled water and allowed to remain some days. When first examined, the oil seemed to be unaffected; it was left a few days longer, and examination showed an oil floating on the surface, whilst the drop still retained its globular form at the bottom of the glass. From this it was rather to be supposed that the oil first obtained was composed of two oils, one heavier and one lighter than water; to prove this the oil was distilled from a solution of potassa to remove the lighter oil, and it was successful, as the surface of the water in the recipient was covered with globules of a colourless oil; to the residue in the retort, sulphuric acid was added, and then subjected to distillation, when, on the surface of the water which came over, globules of the lighter oil were seen floating, and on the bottom of the receiver the heavy oil was to be seen.

4th. An æthereal tincture was made by displacing an ounce of the bruised leaves previously treated with alcohol, to remove the resin and volatile oil; the tincture thus obtained was evaporated, and the extract treated with potassa, washed, and then sulphuric acid was added, without any change of colour ensuing; whilst the tincture was evaporating, a film similar to that of fatty oil was perceptible; the extract had a very pungent taste.

5th. The alcoholic tincture, whilst evaporating, had less of a greasy appearance, and was not possessed of so pungent a taste; this, when evaporated and treated with potassa and washed, was unaffected in colour by sulphuric acid.

6th. A portion of the leaves, previously boiled in water, afterwards evaporated, was treated by acetic acid: the vine-

gar, thus formed, had some of the taste of the plant; and when evaporated to an extract, was treated with sulphuric acid, but no change in colour was perceptible.

7th. A portion of the leaves was incinerated in a crucible and treated with distilled water; after standing over night, and then boiled, the solution browned the turmeric paper very deeply, thus showing a strongly alkaline state. A portion of this solution was filtered into a glass vessel, and to it was added a solution of oxalate of ammonia, which caused a white cloud, and after a time a slight precipitate, thus showing the presence of lime.

8th. A quantity of the leaves previously broken up was put into a sand crucible, heated to redness, and when completely incinerated, the ashes were boiled in water acidulated with nitric acid. When cool, the liquid was filtered into a glass, and a few drops of the solution of ferrocyanuret of potassium were added, which gave the characteristic colour of Prussian blue—showing the presence of iron.

9th. Some of the ashes thus obtained were treated with distilled water and filtered, the solution was then concentrated by boiling, and to the liquor a saturated solution of tartaric acid was added, which after a time produced a crystalline deposit, showing the presence of potassa, and thus confirming the result of Dr. Hodges.

The results of the analysis of Dr. Hodges were as follows:

Chlorophyll soft, dark green resin, brown colouring matter, yellow ditto, gum, nitrate of potassa, bitter principle, maticin, aromatic volatile oil and salts.

The oil is composed of two, one heavier and one lighter than water, and the salts are those of iron, lime and potassa.

It thus appears that there is no principle in matico analogous to piperin, as the crystals mentioned by the author above quoted were left undissolved by the alcohol with which they were treated, and when dissolved in water their base was proven to be potassa, as the chloride of platinum threw down a yellow precipitate.

If the efficiency of this plant depends upon the essential oil, as is thought by Dr. Hodges, how can it be supposed that a cold infusion is the best form of exhibition? Can an aqueous menstruum remove the oil from the leaves and hold it in suspension? To determine whether the oil was removed from the leaves by cold infusion, a portion of the leaves were displaced with distilled water after a maceration of three hours, and introduced into a small glass retort; they were then strongly boiled; the distillate was the same in every apparent property, as that from leaves not previously infused. How this agrees with his opinion that the cold infusion seems the best form for obtaining its medicinal properties, and that the oil is probably the most important principle, is not readily perceived.

U. S. Naval Hospital, New York, August 4, 1846.

ART. XXXIV.—ON THE EMPLOYMENT OF MAGNESIA IN THE TREATMENT OF POISONING BY ARSENIUS ACID.

By A. BUSSY.

THE results of my investigations are,—

1. That purified animal charcoal, recently proposed as an antidote in cases of poisoning with arsenic, cannot be employed with success for this purpose.
2. That pure but slightly calcined magnesia readily absorbs arsenious acid in solution, and forms with it a compound insoluble even in boiling water.
3. That, in the gelatinous state, it absorbs it still more rapidly.
4. That animals to which arsenic had been administered were constantly saved when sufficient doses of magnesia were subsequently given to them.
5. That this antidote has an advantage over all those

hitherto employed, of being always on sale at every chemist's shop, that it readily and entirely neutralizes the poison, that a large amount may be administered without inconvenience, and that its general therapeutic effects are of themselves in relation with the indications to be fulfilled in such cases of poisoning.

6. That magnesia decomposes tartar emetic, salts of copper, and corrosive sublimate; and there is reason to believe that it might be employed with success in combating and mitigating the effects of those poisonous substances, and that of metallic salts in general.

7. That the salts of the organic alkalies, morphine, strychnine, &c., being equally decomposed by magnesia, the use of this substance in cases of poisoning by organic products, whose action is owing to the presence of some vegetable alkaloid, might retard and render the absorption of the poison more difficult. This, however, I intend to confirm by subsequent experiments.—*Chem. Gazette, from Comptes Rendus.*

NOTE.—The observations of M. Bussy, with reference to the use of magnesia as an antidote for several metallic poisons, are of the very first importance, should they prove to be substantiated in practice. So far as arsenious acid is concerned, I have tried several careful experiments, and have arrived at the conclusion that magnesia, like peroxide of iron, is only suitable as an antidote when it is in a hydrated gelatinous condition. A solution containing one grain and a half of arsenious acid was mixed with 30 grains of commercial calcined magnesia, of ascertained good quality, and frequently agitated. After several days the filtered solution yielded abundant green and yellow precipitates with the ammonio-sulphate of copper and the ammonio-nitrate of silver. The same quantity of Henry's or Husband's magnesia was then tried without removing the poison in 24 hours, (after which period it was not tested.) The quantity of magnesia was then increased to 80 grains, which, after a period of an hour or two, had precipitated the arsenic. When, however,

magnesia, as a gelatinous hydrate, thrown down from epsom salts by caustic soda or potassa, and well washed, is employed, the poisonous acid is removed from the solution in a comparatively short time; but not near so quickly as by hydrated sesquioxide of iron—which I believe to be a more eligible antidote, and quite as quickly prepared, being more easily washed than the magnesia.

It would be inferred, *à priori*, as the arsenite of magnesia is an insoluble salt, that sulphate of magnesia would be a perfect antidote for arsenite of potassa, but on adding a solution of epsom salts to Fowler's arsenical solution the mixture remains transparent!

The importance of M. Bussy's conclusions to toxicological knowledge, deserve a more extended examination than I have been able at this time to give them.—W. P., jr.

ART. XXXV.—ON AMORPHOUS QUININE AS IT EXISTS IN THE SUBSTANCE KNOWN IN COMMERCE AS QUINOIDINE.

By BARON LIEBIG.

THE following excellent paper appeared in The Lancet of the 23d May :—

In the preparation of sulphate of quinine, after all the crystals which can be obtained are separated, a dark-coloured mother-liquor remains, having an extremely bitter taste. On the addition of an alkaline carbonate, this liquid loses its colour and bitter taste, depositing at the same time, a yellowish-white, or brownish precipitate, which, after

being rinsed with water, and exposed to a gentle heat, agglutinates into a coherent mass, exhibiting the appearance of resin.

From the experiments of Sertuerner, Thiele, Bucholz, junior, Koch, and other chemists, it has been long known that this resinous substance possesses the properties of a base, that it neutralizes acids perfectly; but the salts which are formed by these combinations with acids, have baffled all attempts at crystallization.

Sertuerner, who was the first chemist to separate this resinous substance from the mother-liquor of sulphate of quinine, considered it to be a distinct and peculiar organic base, existing in yellow and red cinchona barks, associated with quinine and cinchonine. He assigned to this, as he supposed, new substance, the name quinoidine, and greatly extolled its medicinal efficacy, in which he declared it was in all respects equal to quinine. In his journal (*Über die neueste Fortschritte in der Chemie, Physik und Heilkunde*, Bd. iii., No. 2, page 269,) he terms it "a true fever-destroyer."

Subsequently, this substance, under the term quinoidine, has been employed medicinally in many places, and even introduced into the lists of commercial articles or price currents of many of the druggists of Germany.

In certain mother-liquors of quinine left in the preparation of the sulphate, which were analysed by Henry and Delondre, and also a sample of quinoidine examined by Geiger, these able chemists discovered an amount of quinine and cinchonine, accompanied by a resinous substance which they considered impeded the crystallization of the sulphates of the two bases, and which in their experiments they failed to separate. The results obtained by these chemists, and the inferences obviously deducible from these results, rendered it indubitable that the medicinal efficacy of quinoidine must vary according to the greater or less proportion of quinine it may happen to contain. Now, there

cannot be a doubt but that this uncertainty with respect to the relative amount of quinine in commercial quinoidine has prevented many physicians from prescribing the latter as a remedy, notwithstanding the testimony borne to its efficacy.

Having occasion, some time since, to pass through Coblenz, I procured from Messrs. Jobst & Co., of that town, a sample of quinoidine, for the purpose of employing it for the preparation of quinoleine—a substance discovered by Gerhardt to result from the transformation of quinine, and to which much scientific interest attaches, in consequence of the recent discovery of Professor A. W. Hofmann, that quinoleine is identical with leucol, a body which is one of the components of the essential oil of tar, prepared from anthracite coal. It then occurred to me, that if the sample of quinoidine which I had procured, contained quinine, it must yield a corresponding amount of quinoleine, and that, consequently, a very simple method of testing quinoidine for the amount of quinine it may contain, might be based upon this property of quinine to be transformed into quinoleine.

On subjecting the sample I had obtained (which amounted to several ounces) to distillation with strong potass ley, I confess I was surprised at the large amount of quinoleine produced, which proved the presence of a far larger proportion of quinine than could have been anticipated. This unexpected result induced me to subject quinoidine to a stricter examination; and in order to avoid being misled by accidental circumstances, I procured, beside the Coblenz sample, specimens from Messrs. Hess, Leissler, and Fiedler, of Mayence, and from Messrs. Mettenheimer and Simon, at Frankfort, and also from a druggist at Hamburg.

These various samples of quinoidine I received partly in irregularly shaped masses, and partly as square cakes of a darker or lighter brown colour, which, by the warmth of the hand, became soft and flexible, but were readily pul-

verizable in the cold. The operation of powdering imparted to it an extraordinary degree of elasticity. All these samples were completely insoluble in cold water, but scantily soluble in hot water, imparting to the latter a strongly bitter taste. I may here, however, observe, in passing, that some commercial specimens which I have since seen are soluble in cold water, arising from a considerable admixture of other substances; differing, also, from the same cause, in many of the following properties:—

All the first samples I speak of dissolved in alcohol, in the proportion of one part to two of the menstruum; and from this alcoholic solution, water precipitates copious, yellowish-white, resinous flakes, which cohere into a mass like the original quinoidine. Dilute mineral acids, as well as most of the organic acids, dissolved my samples entirely, and by adding a sufficient amount of the substance, became completely neutralised. From these solutions in acids, ammonia and alkaline carbonates precipitated resinous flakes. On agitating the fluid containing these flakes and the flocculent precipitate, with an equal volume of ether, the precipitate dissolves in the ether, *with the exception of a dark-brown residue*. On evaporating the ether, a resinous mass is obtained, having all the properties of an organic alkaloid.

Its salts are precipitated by tannic acid. Chloride of platinum produces, in its solution in hydrochloric acid, a yellow precipitate. Moreover, it dissolves completely in a solution of sulphate of copper, with the separation of oxide of copper. Now there exists no resin, nor, indeed, any other substance similar to resin, which possesses this peculiar property.

These observations can leave no doubt whatever as to the chemical character of a considerable proportion of the residue to which the term quinoidine has been applied—namely, that it is a true organic base.

On subjecting the purified substance to elementary analysis, the following were the results:—

I. From the quinoidine of Mayence, 0.490 grammes yielded 1.3204 grammes of carbonic acid, and 0.3395 grammes of water.

II. From the quinoidine of Frankfort, 0.618 grammes yielded 1.6575 grammes of carbonic acid, and 0.4250 grammes of water.

III. From the quinoidine of Coblenz, 0.3475 grammes yielded 0.9475 grammes of carbonic acid, and 0.2375 grammes of water.

According to these analyses, this substance contains—

	I.	II.	III.
Carbon	73.49	73.14	74.93*
Hydrogen	7.69	7.64	7.57

The determination of the nitrogen, by the method of Verrentropp and Will, yielded the following results :—

0.515 afforded 0.289 of platinum.

0.617 “ 0.401 “

And, consequently, the substance under examination contains, according to the first analysis, 8.04 of nitrogen; according to the second, 9.54 of nitrogen—the medium of the two analyses giving us as its amount of nitrogen, 8.79.

Analyses of the Chloride of Platinum and the base from Quinoidine, (Amorphous Quinine.)

I. 0.6663 grammes of the double salt yielded 0.1755 of platinum; 0.8700 grammes of the double salt yielded 1.349 carbonic acid, and 0.303 of water.

II. 0.881 grammes of double salt yielded 0.224 of platinum.

III. 1.0668 grammes of double salt yielded 0.2715 of platinum.

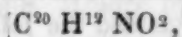
From these analyses, therefore, the following are the proportions of carbon, hydrogen, and platinum, which exist in 100 parts of the chloride of platinum, and the substance derived from quinoidine :—

* Carbon=75, according to Prout and Dumas.

	I.	II.	III.
Carbon	32.44		
Hydrogen	3.86		
Platinum	26.33	26.32	26.45

Now, if we compare the proportion of carbon, hydrogen, and platinum, existing in the chloride of platinum and this base, derived from quinoidine, with the amount of the same elements present in the corresponding chloride of platinum and quinine; and, further, the amount of carbon, hydrogen, and nitrogen, contained in the substance under examination, with the proportion of the same elements as they exist in quinine; we perceive at once that the two substances have identically the same composition.

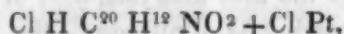
Quinine, according to the formula—



contains—

Carbon, 74.33; hydrogen, 7.75; nitrogen, 8.62.

Chloride of platinum and quinine, according to the formula—



contains—

Carbon, 32.38; hydrogen, 3.53; platinum, 26.83.

The inference from these experiments, then, is irresistible: the uncrystalline substance derived from quinoidine bears exactly the same relation to ordinary quinine that uncrystalline sugar (barley-sugar) bears to crystalline (sugar-candy.) Both yield the same atomic weight, and identically the same composition; they differ only in form: in one word, one is crystalline, the other *amorphous*.

I deem this to be an important discovery, when we consider the high price of quinine, the possibility of a check to the supply of cinchona bark from the countries producing it, and the amount of the crude quinoidine which has accumulated since the manufacture of sulphate of quinine was commenced. Quinine, indeed, seems to be absolutely indispensable for the treatment of diseases; the progress of

civilization in modern times has depended, far more than has been conceived, upon the discovery of a remedy for the fevers which prevailed where tillage is imperfect, and in new and unbroken soils.

This chemical investigation has thrown an interesting light upon the testimonies borne to the efficacy of quinoidine in the treatment of fever, and the highest encomiums have been passed upon it; but the commercial specimens have differed very much in value; while some have consisted nearly altogether of amorphous quinine, others have contained only a small per centage.

It is necessary that the amorphous quinine should be separated from all admixtures and impurities, and prescribed in its pure state. There can be no doubt but the same substance will produce the same effect on the animal organism, whether exhibited in a crystalline or an amorphous state. The system, as we may say, makes no difference in such a case. As I have already observed, the mystery about quinoidine is completely solved by the discovery, that it usually contains a very large per centage of pure quinine in an amorphous state.

In a commercial point of view, it is certainly a matter of great importance that we should be able to judge by the mere external appearance of a remedy, of its purity; and, consequently, how far we may rely upon its efficacy. This is thought to be the case with the crystalline sulphate of quinine, whilst the non-crystalline form of quinoidine has probably led to a disregard of the evidence for its usefulness, even more than the fact of its being, as usually sold, an admixture of various substances. But with respect to the mere amorphous form, when the quinine is separated from all its adhering impurities, it is in the same case with opium, castor, and many more of the most efficient remedies which we possess, particularly with the extracts of our pharmacopœias. It is necessary to be assured of their purity before we employ them, but their amorphous form does not

prevent their use. In many of these cases, indeed, having no direct or ready way of testing them, we rely solely upon the honorable character of the merchant and dealer; but we have a completely satisfactory test for the purity of amorphous quinine. Few medicinal agents afford so ready a means of distinguishing them, and detecting admixtures, as the organic alkaloids: but if these tests are not employed, it is as easy to be deceived in purchasing crystalline sulphate of quinine, as the amorphous.

Amorphous quinine is completely soluble in dilute sulphuric acid, and in alcohol, as I have said above; it is also completely soluble in a solution of sulphate of copper, with separation of oxide of copper. And if its solution in a dilute acid yields, upon precipitation by means of ammonia, exactly the same amount of precipitate as the weight of the substance originally dissolved in the acid, there can be no doubt remaining as to the perfect purity of the sample under examination.

It only remains for me to observe, that no dependence should be placed upon the ordinary quiniodine of commerce. As I have already stated, some samples which I have seen, dissolve incompletely in water, forming a dark-brown muddy fluid; these have been probably produced by simply evaporating the mother-liquors of sulphate of quinine to dryness. They are, therefore, uncertain mixtures of various substances with sulphate of amorphous quinine, with or without excess of acid, so that in purchasing such specimens, the buyer is paying the price of an organic alkaloid for sulphuric acid, &c. The pure amorphous quinine should be separated, and it would then form a most valuable remedial agent; but the prescriber must be assured of its purity, and the test I have given will suffice for this purpose.—*Chemist.*

ART. XXXVI.—AMORPHOUS QUININE.

BY DR. NATORRS.

You tell me that you are desirous to know whether I continue to employ the uncrystalline alkaloid of the cinchona bark, and what are the results of my experience respecting the therapeutic effects of this remedy. In answer to your inquiries, I am happy to communicate the following effects :

The late Mr. Reidel, pharmaceutical chemist, was largely engaged in the manufacture of the various preparations of cinchona bark, and he obtained an uncrystallisable residue, incapable of further purification. Thinking that this substance might be employed as a remedy, he furnished me with a considerable quantity, for the purpose of making experiments in my practice among the poor peasantry. It happened that just at that time an epidemic intermittent fever was raging in Berlin and the neighborhood, which gave me a most favorable opportunity of testing its anti-intermittent power ; and I was quite astonished at the extraordinary effect of this new substance. Another physician, Dr. Skilling, physician to the forces, made at the same time similar experiments with it, and obtained the same results. As the fever was excessively prevalent in the villages around Berlin, many of the proprietors to whom I am physician applied to me to furnish them with a remedy against the disease. I prescribed the new substance in question, in solution, as I will presently explain ; and the result was, the rapid disappearance of the malady from their estates. The reputation of these cures at that time extended so far, that the peasants came from forty-five to fifty miles' distant to fetch 'the fever-drops.' One proprietor of a large estate near Warsaw, hearing that an epidemic fever had broken out amongst his peasantry, forwarded large quantities of the fever-drops, and he was soon gratified with the

intelligence that the use of this remarkable remedy had been attended with immediate success.

I now employ this substance only, to the exclusion of all other preparations from bark, quinine, &c., in all cases of intermittent fever; and I can boldly assert, that in the experience of many years it has never disappointed me. It has this great and inestimable advantage, that one can determine with absolute certainty, by administering it, that the recurrence of the attack shall be prevented. No other preparation of bark, and no other remedy that I know of, will enable us to say with positive certainty that the next expected accession shall not take place. Moreover, it prevents the occurrence of relapses, more than any other febrifuge; and in many thousands of cases in which I have had occasion to employ it, I have never seen the cessation of the fever followed by unpleasant sequelæ. My way of prescribing this remedy is in a spirituous solution, of which I mix one ounce, with acid of Haller, a drachm; peppermint-water, three ounces. Of these drops, I give in quotidian fever a teaspoonful ever hour from the commencement of the perspiration; in tertian, one every two hours; in quartan, one every three hours.

When the attacks have ceased, which I feel almost inclined to assert is uniformly the result of the administration of this remedy, I always give a teaspoonful of the above mixture every night and morning, until there is no longer any fear of a relapse.

I have also experienced the efficacy of this remedy in fevers of a sporadic origin; and I and many physicians of Berlin employ it as a tonic in all cases where we used to prescribe any of the other forms of bark.

I will not presume to pronounce on the chemical nature of this uncrystalline body. I suspect that 'chinoroth' plays an important part in it.

Should you deem any further or more minute information respecting this matter desirable, I shall be happy to supply

you with all I know. You are at liberty to publish or make what use you think proper of this communication.

I may add, that this substance will be introduced into the next edition of the "Prussian Pharmacopœia."—*London Lancet.*

ART. XXXVII.—NEW APPARATUS FOR EXTRACTING THE COLOURING FROM DYE WOODS.

By M. IWAN SCHLUMBERGER.

AT a meeting of your committee of chemistry I communicated the advantages which I had found in the apparatus of Mr. Meissonnier, for extracting the colouring matter of logwood. Some members appearing to doubt the real merit of this apparatus, from not having produced results analogous to mine, on trying it, I made some fresh experiments, which I explained to your committee of chemistry, accompanied by calculations which any other person might make.

It is of some of these experiments I am now about to speak.

In order to make decoctions of logwood, the usual method is, to put a quantity of shavings of that wood into a boiler in immediate contact with the fire, together with a quantity of water, sufficient to cover the wood completely, so that after boiling for some hours the wood may be quite covered. The operation is renewed twice with the same liquor, and after three successful boilings, the decoctions are mixed together and evaporated to the degree required.

This operation is attended with several disadvantages. Shavings only can be employed, for if the logwood be re-

duced to powder, it absorbs so much water that a great quantity of liquid is lost, and the shavings being rather thick, the water cannot readily penetrate, for which reason the time of boiling is very much prolonged.

Notwithstanding these three long boilings, if the same wood be boiled a fourth time, a liquid pretty well coloured is obtained; which clearly shows that all the coloring matter has not been extracted.

Besides this, when decoctions of logwood are required in large quantities, very large vessels and extensive premises are necessary, as well as several furnaces, in order to produce a sufficient quantity: for the wood, when in shavings, is very bulky without being heavy, and large boilers are required for making a decoction from 50 lbs. of shavings, with the necessary quantity of water. Several boilers must, therefore, be employed, otherwise the fire must be kept up day and night.

I will here describe, *en passant*, for the benefit of those persons who have not many furnaces, but who have a steam-pipe at command, a method which I have employed for some time to make decoctions in great quantities, and which, I think, I can recommend in this instance.

A large high narrow vat, capable of containing about from 100 to 150 lbs. of wood shavings, is mounted upon a stand or framing, and furnished with a cock below, in order to draw off the liquor. At a short distance above the cock, inside the vat, a false bottom or diaphragm, pierced with holes very close to each other, is fixed, in order to leave a space at the bottom to prevent the wood from clogging up the cock, and stopping the flow of the liquor. A steam-pipe, about one-third of an inch in diameter, is carried to the bottom of the vat, which is filled with shavings. It is covered with a cloth and a cover, which is weighed, in order to prevent the steam from issuing out in too great abundance. The shavings must not be heaped up more than in the common boilers. In this state, steam is allowed to flow in for

an hour at least, until it escapes out in moderate quantities at the top. During this time the wood swells and becomes penetrated by the steam; then, when the vat is filled with water, it will be sufficient to heat to the boiling point, in order to obtain, the first time, a strong decoction. The vat is afterwards filled twice in succession, and made to boil as usual; and in the same space of time, with less labour, a much larger quantity of decoction is obtained, and much more colouring matter extracted.

By the two methods just mentioned, considerable time is required for each operation, and the wood is not entirely exhausted of colouring matter; but with M. Meissonnier's apparatus much more advantageous results are attained.

This improved apparatus consists of a copper boiler of about a foot and a half in width, and about two feet in depth. At a short distance from the bottom of the boiler is a false bottom, pierced with a multitude of holes, which sustains the wood in the water, and leaves an empty space for the boiling liquor. Into the boiler powdered wood is thrown, and it is covered first, with strong wire-work, and then with a copper-plate pierced with small holes, which cover is held firmly down upon the edges of the boiler by any suitable means. At the side of the boiler is a small lift and force pump, simply constructed, which draws the boiling water from any suitable vessel and forces it through a pipe into the empty space at the bottom of the boiler. The water after passing through the wood and the pierced cover of the boiler, is run off into any suitable receiver.

In our manufactory, at the side of the pump, is a boiler, heated with a coal fire, capable of containing 450 quarts of water, which is to be boiled for each operation. After filling it, and lighting the fire, the other boiler is filled with powdered logwood, spread as evenly as possible, until it contains from 84 to 90 pounds of wood. The water having arrived at the boiling point is then forced into the space at the bottom of the vessel containing the dyewood,

and driven up through the wood. In this manner, in two hours, the 450 quarts pass through and extract all the colouring matter from the dyewood.

The liquor which has passed through the wood is divided into three distinct portions, in this manner : a first portion of the decoction may be $3\frac{1}{2}^{\circ}$ Beaumé ; a second, $1\frac{1}{2}^{\circ}$; a third, $\frac{1}{2}^{\circ}$; and lastly, a fourth portion of liquid very slightly coloured, which may be mixed with the water for the next operation. In this manner the most advantageous results are secured, as three decoctions of different degrees of strength are obtained at one working, without evaporation.

When a second operation is not commenced immediately, the waste heat of the furnace is employed to concentrate the liquor.

I will compare the advantage of this apparatus with that which we were obliged previously to use.

This, in a boiler heated by fire, 140 pounds of shavings and 80 quarts of water were put, and the liquor was boiled for four hours : this was renewed three times. For 40 pounds of logwood, it was, therefore, necessary to boil 240 quarts of water for twelve hours. I double these quantities the better to compare them with those produced by the new apparatus. Thus, by the old method, for 80 pounds of wood it was necessary to boil 480 quarts of water during twenty-four hours.

By the novel method, when from 84 to 90 pounds of wood are operated upon, two hours are necessary for heating the 450 quarts of water, and two hours for pumping it through the wood. Therefore, for 84 pounds of wood, it will be necessary to heat 450 quarts of water for four hours, effecting an economy of fuel for twenty hours' consumption.

Besides this, the colouring matter is better extracted, and a great economy of labour is effected, as one man can effect two operations per diem.

Several precautions are necessary, in fact indispensable, to ensure complete success ; for instance, the wood must be

very evenly spread, in order that the resistance offered to the water may be equal throughout; and, for this purpose, the wood must be put into the vessel in small quantities at a time. A very important point is, to have the wood ground or rasped of a uniform size, without fine dust, as the particles of this latter are apt to adhere together, and offer great resistance to the water at certain parts; thus preventing the colouring matter from being extracted therefrom. I have found that the wood spreads much better by previously wetting it.

For some other woods, such as Lima and Pernamcubo woods, and other red dyewoods, 600 quarts of water, instead of 450, must be employed, as the colouring matter is not so easily extracted. Quercitron cannot be operated upon as it is too fine a powder. Cochineal does not succeed, as it swells so much on coming in contact with boiling water, that, in an experiment I made, I thought it would have burst the boiler.

This apparatus is, however, very advantageous for the woods above mentioned, if the directions given are carefully followed.—*Chemist, from Newton's London Journal.*

ART. XXXVIII.—ON THE QUANTITATIVE ESTIMATION OF
BROMINE IN MINERAL WATERS.

By M. HEINE.

[THIS process is described in a work bearing the title, "Chemical Investigation of the Brines, Salts and residues of the Graduation Works in Saxony and Westphalia." Hitherto we possessed no accurate quantitative method for the determination of this important substance in mineral

waters. Although the process of M. Heine cannot lay claim to the most perfect accuracy, we have no doubt it will be found preferable to any other method now in use.]

The usual qualitative test for bromine, consists in mixing the solution supposed to contain the bromides with some æther, then carefully adding chlorine water and leaving the fluid in quiet; the æther collects on the surface. It is colourless when no bromine is present, faintly yellow when there is little, slightly or strongly brown when in greater quantity. To make use of this test in quantitative investigations, several precautions must be taken. In the first place, it had to be ascertained whether the mother-leys, which are sometimes of a yellow colour, would impart this colour to the æther; experiments proved this not to be the case. On adding chlorine water to the leys, they were more or less decolourized, a proof that the yellow colour was owing to organic substances. It is further known that æther assumes a faint yellow tint when it is shaken with chlorine water; it became requisite to know whether a small quantity of chlorine water is capable of producing this colouration, or only large quantities. A considerable amount of chlorine water was employed, before its influence on the colour of the æther became perceptible. In order to conclude with probability as to the quantity of bromine, so much chlorine water had to be employed that all the bromine was set free and taken up by the æther. It was therefore requisite to determine this quantity, by the addition of more or less chlorine water to liquids containing the same amount of bromine, and by comparing the tints of the æther*. The volatility of the æther and the bromine had also to be considered, and the glasses had to be made so that they could be closed tight and very quickly, and at the same time be almost entirely filled. And lastly, it was requisite to use equal quantities of æther, &c., for all the

*It is necessary to use the strongest possible chlorine water recently prepared.

experiments, and equally coloured, or rather colourless glasses of the same size, that the layer of ether might be of the same height and breadth.

In the next place, a series of liquids containing a known amount of bromine, was prepared by dissolving in every 25 grms. of distilled water, from 5 to 50 milligrms. of bromine. In this way I formed a series of equally large test-tubes of white glass, which contained in the same quantity of water (25 grms.), 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50 milligrms. of bromide of potassium. Equal quantities of ether, measured in the same glass, were added to these solutions, and the tubes immediately closed.

The same vessel which served to measure the ether, answered also for the chlorine water, it having been previously found by experiment, that more chlorine water did not render the ether of the solution containing most bromine darker. The addition of the chlorine water to the test-glasses, was likewise effected as quickly as possible. They were then well shaken; the ether soon collected on the surface, and a beautiful, extremely regular scale of colours from yellow to brown was obtained—a proof that that the solutions might serve as standards for comparison. Beyond 50 the comparison becomes more uncertain, because the tints of every additional 5 milligrms. of bromide of potassium can no longer be well-distinguished on account of the dark colour. It is however evident that 5 milligrms. bromide of potassium = 3.3 milligrms. bromine, dissolved in 25 grms. water, diluted therefore 7600 times, exhibit a remarkable reaction, and that the limit of sensibility is far greater, certainly beyond 20,000 times dilution.

As soon as the scale of colours had been prepared, the glasses filled with mother-ley and ether, which were perfectly similar in size and had been previously arranged, were shaken with chlorine water, and the tints produced compared with those of the test-glasses. Each glass contained equal volumes of the ley from the different salt-works,

measured in a vessel capable of containing 25 grms. of water; and the same quantities of ether and chlorine water were added to them as to the test-liquid. The operation requires to be made with great haste, because after some time the colour of the ether decreases, and entirely disappears in the course of 12 to 16 hours.

The following are the results of several experiments:—

No.	Spec. grav.	Mother-ley.	Salt-works.	Corresponded to a test-liquor containing bromide of potassium, Milligrams.	The ley consequently contains	
					Bromide of potassium In 100 parts.	Bromine
		Grms.				
1.	1.255	31.375	Halle	41	0.131	0.087
2.	1.270	31.750	Kösen	36	0.113	0.075
3.	1.315	32.875	..	35*	0.107	0.071
4.	1.303	32.575	Artern	32	0.098	0.065
5.	1.250	31.250	Schönebeck	29	0.093	0.062
6.	1.273	31.825	..	33	0.104	0.069

In such cases as the above, in which the amount of bromine is by no means considerable, the method proposed for ascertaining its amount by means of a scale of colours appears to me more certain than the analytical determination from the mixture of chloride and bromide of silver according to Rose. The numbers obtained for the bromine should properly be subtracted from the amounts of chlorine; but they are not sufficiently large to render a re-calculation of the results of the analysis of the leys necessary.

Quite as accurately, if not more so, may iodine be estimated in liquids by the well known method with solution of starch and nitric acid. A large amount of chlorine (which is the case in the brines and leys from salt works) is, it is true, a hindrance; I have however convinced myself, by the addition of $\frac{1}{3000}$ iodide of potassium, that the

*This sample on shaking, yielded a froth which floated in the layer of ether, and somewhat prevented the comparison of the colour; however, the error cannot be very considerable.

reaction with starch and sulphuric acid is still perceptible. I only obtained distinct evidence of iodine in the mother-leys from the salt works of Halle; in all the others none, or so very slight, that the presene of iodine cannot be asserted positively.—*Chem. Gaz. from Journ. für Prakt. Chem.*

ART. XXXIX.—ON AN ADVANTAGEOUS METHOD OF PREPARING CHROMIC ACID, AND ON A PECULIAR BEHAVIOUR OF THIS ACID TOWARDS SULPHURIC ACID.

By DR. P. A. BOLLEY.

THE process described by Fritzsche for preparing chromic acid from a hot solution of the bichromate of potash by means of sulphuric acid, is decidedly preferable to every other on account of the large produce. Warington and Böttger have modified this process, because the product obtained according to Fritzsche's method is not pure, but always contains some sulphate of potash; they recommend mixing a cold saturated solution of the bichromate of potash with 1 or $1\frac{1}{2}$ parts of monohydrated sulphuric acid.

The proportion of the sulphuric acid to the bichromate of potash is not stated by Fritzsche; the amount of acid prescribed by Warington and Böttger is so remarkably great and renders the product so dear, that it is worth while endeavouring to find a process requiring less sulphuric acid.

When 12 to 15 parts by measure of sulphuric acid are prescribed for 10 parts of the solution of the salt saturated at the ordinary temperature, this large amount has certainly some other part to act than the decomposition of the salt, viz. the precipitation of the eliminated chromic acid from its aqueous solution. I endeavoured to separate the

two effects, and from the peculiar property which will subsequently be described, I adopted the following process as the best:

A boiling saturated solution of the bichromate of potash is formed, and during ebullition a weighed quantity of sulphuric acid added to it sufficient to form with the potash bisulphate. The mixture is allowed to cool, when it solidifies for the greater part to a granular red mass. This is not chromic acid, but sulphate of potash, with adherent chromic acid, together with which is formed a concentrated solution of chromic acid, which likewise contains some sulphate of potash. The mass is stirred with a rod to cause the granular part to subside, and the liquid portion decanted. The residuous mass is agitated with several small quantities of cold water, and what dissolves poured off. In this way there is at last contained in the dish an orange-coloured sulphate of potash with very little chromic acid. Most of the chromic acid is contained in the united solution.

This process depends on the circumstance, that bisulphate of potash, which is very soluble at a boiling temperature (1 part in $\frac{1}{2}$ water,) is dissolved with difficulty at the ordinary temperature, and that cold water mostly removes from it sulphuric acid with scarcely any potash, leaving behind neutral sulphate of potash, while the chromic acid is extremely soluble in the cold water. The concentrated solution of the chromic acid, containing a little sulphate of potash and sulphuric acid, may now be somewhat evaporated, and the chromic acid precipitated from it by the addition of sulphuric acid, without any perceptible traces of the sulphate of potash being thrown down with it; for this salt is readily soluble in the monohydrated sulphuric acid, and still more readily in acid more diluted. The chromic acid is separated from the liquid by draining on a funnel, the neck of which is loosely stopped with fragments of glass, and then dried on porous tiles; by re-solution in water and slow evaporation, it may be obtained perfectly pure in

large crystals. In volume there may have been used the same or $1\frac{1}{2}$ time the amount of sulphuric acid, but the solution contains far more chromic acid than with Warington's process. The produce in chromic acid for the same quantity of sulphuric acid is consequently far greater, almost in proportion to the increase of solubility of the potash salt at the ordinary temperature and boiling-point; 1 part by weight of the salt requires at boiling-point nearly 1 part by weight of water, and the solution boils at 218° ; at 64° it requires ten times the amount of water.

If, in this method, sulphuric acid is saved, the chromate of potash, on the contrary, is not wholly turned to account as in the other method; this does not render it less preferable in a pecuniary point of view, for all the residues, both the solid sulphate of potash which is mixed with chromic acid, as well as the acid liquid drained from the chromic acid, may be advantageously employed for the preparation of oxygen. It is only necessary to evaporate the acid somewhat previously, because when very dilute it does not decompose the chromic acid when heated with it. Böttger states that the residuary sulphuric acid may be used for purifying phosphorus from oxide of phosphorus, an application however which is of far less frequent occurrence than the preparation of oxygen.

All the methods above described for preparing chromic acid from its potash salt, readily lead us to believe that the chromic acid is insoluble in monohydrated sulphuric acid, because it is precipitated by it from its aqueous solution; such however is not the case. Sulphuric acid (SO^3, HO) dissolves considerable quantities of chromic acid at the ordinary temperature, becoming yellow, and finally quite dark brown and opaque. I soon cleared up this apparent contradiction, by adding a few drops of water to the solution of the chromic acid in the sulphuric acid; the chromic acid immediately separated. Since this proves that the chromic acid is precipitated from its *aqueous solution* by

sulphuric acid, but from its *sulphatic solution* by water, then there must exist a proportion between the sulphuric acid and water in which chromic acid is not soluble; to find out this proportion, I made a series of experiments, the result of which was that the amount of water of the sulphuric acid came very near to the formula $\text{SO}^3\text{2HO}$. In fact, if we consider the solution of the chromic acid in monohydrated sulphuric acid as constituted according to the formula $\text{SO}^3\text{HO} + x\text{CrO}^3$, then CrO^3 is separated on the addition of 1 atom of water.

The author then proceeds to describe a combination of chromic acid with sulphuric acid, which is obtained when the former is gradually conveyed into the latter, and the mixture shaken for some time in a well-stoppered bottle for the complete solution of the chromic acid. After some time no more chromic acid dissolves, and the dark-brown fluid, at first of an oily consistence, acquires an ochreous colour, and a pasty consistence, and even becomes sometimes granular. Its analysis is difficult, from the avidity with which it imbibes moisture. From the results obtained, however, it would appear to be composed according to the formula $\text{SO}^3\text{HO} + \text{CrO}^3$.

In conclusion, the author observes that the solution of chromic acid in monohydrated sulphuric acid is preferable as an oxidizing agent to every other; its action on sugar or alcohol is so complete and quick, that the former, when not added in too large a quantity, may be entirely burnt into carbonic acid and water; while the alcohol, according to the quantity and degree of concentration, may be converted at pleasure either into aldehyde or acetic acid, a change which deserves mention as a very instructive class experiment, because the product of the reduction is immediately visible to the eye, and the product of oxidation readily detected by the organs of smell.—*Chem. Gaz., from Liebig's Annalen.*

ART. XL.—ON THE PRECIPITATION OF DIFFERENT ORGANIC AND INORGANIC SUBSTANCES BY ANIMAL CHARCOAL.

By F. WEPPEN.

FROM the fact that animal charcoal precipitates a number of very different colouring matters from their solutions, it was presumed that this effect was not limited to colouring matters, and the presumption has been substantiated by the following experiments, which show that animal charcoal likewise precipitates bitter substances, resins, and substances containing tannin. The charcoal used for these experiments was obtained from bone-black by repeatedly boiling it with muriatic acid; afterwards well washing it, and then exposing it to moderate red heat.

1. *Organic Substances.*

1. *Bitter Substances.*—Ten grains of the substance were digested with two ounces of boiling water, and the filtered infusion shaken with the charcoal, until the bitter taste had entirely disappeared.

Names of the bitter substance.	Quantity of charcoal.
Wormwood - - -	30 grains.
Colocynth - - -	30 "
Gentian Root - - -	20 "
Columbo Root - - -	10 "
Quassia - - -	30 "
Cascarilla Bark - - -	30 "
Menyanthes trifoliata - - -	30 "

A solution of two grains of *extract of aloes* in two ounces of water, became quite tasteless with forty grains of charcoal.

2. *Resins.*—One drachm of the tincture of *guaiacum* and of the tincture of *jalap* were respectively diluted with as much alcohol; the first required thirteen grains, and the latter twenty-five grains of charcoal to precipitate the resin contained there

in to such a degree, that the solution became only very slightly clouded upon the addition of water.

3. *Astringent Substances*.—A solution of one grain of extract of *nutgalls* in half-an-ounce of water required twenty grains of charcoal; a solution of half-a-grain of *pure tannin* dissolved in half-an-ounce of water required ten grains of charcoal; an infusion of ten grains of *rhatany root* and the same quantity of *cinchona bark* in two ounces of water, required twenty grains of charcoal to deprive them of their power of reacting on the salts of iron.

2. *Inorganic Substances*.

That animal charcoal precipitates certain *metallic salts* from their solutions in water or spirit of wine, is a fact which has been long established. I find that probably all metallic solutions are similarly affected, though some require more charcoal than others. Moreover, this effect does not depend on the chemical constitution of the metallic oxide, whether its formula be MO or M_2O_3 .

The following salts were subjected to experiment:—

Sulphate of copper	Chloride of tin
“ zinc	Corrosive sublimate
“ protoxide of iron	Acetate of the oxide of iron
“ oxide of chromium	Nitrate of nickel
Nitrate of oxide of mercury	“ protoxide of cobalt
Acetate of lead	“ silver
Emetic tartar	“ protoxide of mercury

On an average, thirty grains of charcoal were required for every grain of these salts, dissolved in half an ounce of water; but, for reasons hereafter mentioned, it was difficult to precipitate them entirely, the addition of charcoal only rendering the reaction less distinct.

If caustic ammonia be added to those salts whose bases cannot be precipitated by ammonia, or which are redissolved by excess of the precipitant (copper, zinc, silver, lead in sugar of lead) much less charcoal is required; and the precipitation takes place much sooner. Not merely basic metallic oxides, but also

certain metallic acids are precipitated by charcoal; oxide of lead dissolved in caustic potash was precipitated by charcoal; also the acids from antimoniate of potash and tungstate of ammonia. On the other hand, no effect was obtained on arseniate and arsenite of soda; and arsenious acid dissolved in water could not be entirely precipitated by animal charcoal. Bichromate of potash and chromic acid were reduced by the charcoal, in the cold slowly but yet completely. The chromate of potash became converted into carbonate of potash. Furthermore, the charcoal precipitated iodide of mercury from the ammoniacal iodide of mercury; and sulphuret of antimony from the ammoniacal sulphuret arsenic.

A solution of iodine in water or in iodide of potassium is quickly decolourized by charcoal; but it is impossible to precipitate sulphur from its solutions in alcohol or oil of turpentine; for even after a large addition of charcoal, the filtered fluid heated over a silver plate still yielded traces of sulphuret of silver.

Salts having an alkaline base, as cream of tartar, ferrocyanide of potassium, gypsum, and alum, and also lime-water, appeared to be unaffected by charcoal; but a reaction takes place on chloride of barium, particularly if a few drops of caustic ammonia be added to the solution.

In the precipitation of metallic salts by charcoal, three circumstances may happen:—1. The salt may be absorbed without decomposition. 2. The oxide contained in the salt may be reduced; or 3. The salts may be precipitated in a basic state. With some of the salts (sulphate of the protoxide of iron and corrosive sublimate) the latter takes place. As soon as the charcoal begins to act, the solution of the salt becomes distinctly acid, and by quantitative examination, the greatest part of the acid will be again found in the fluid. This separation of the salts into acid and basic compounds is the reason why the last traces of the bases are so difficult to be removed by charcoal; for the acid which has become free prevents the perfect precipitation. Hence also, a salt to which some free acid has been added, is but little or not at all affected by charcoal.

So also if we boil with acid the charcoal which has been used for precipitation, the precipitated oxides or basic salts contained therein, can almost entirely be extracted, though the last traces of the same resist the action of the acids.

Mulder mentions in his *Physiology*, that lead can be precipitated in the metallic state from sugar of lead, by means of charcoal. If this were the case, no oxide of lead could be extracted by boiling the washed charcoal in acetic acid. Whether easily reducible, metallic oxides, for example, oxide of silver, can be reduced to the metallic state by charcoal, I have not ascertained.

It has lately been asserted that the precipitation of the metallic salts by charcoal depends on the calcareous salt, which cannot perfectly be extracted by the application of acids. If this were the case, by the application of a salt, whose acid forms a very easily soluble combination with lime, a calcareous salt would be found in the liquid standing over the charcoal.

In order to determine this I dissolved ten grains of corrosive sublimate in two ounces of water, and shook this with ten scruples of charcoal. The acid liquor was filtered, deprived of every trace of mercury by sulphuretted hydrogen, and evaporated. The last drops of the liquid certainly showed distinct traces of lime. The charcoal used in this experiment was then boiled with muriatic acid, washed, and again mixed with ten grains of a solution of corrosive sublimate. In both the second and third trials traces of a calcareous salt were found in the liquid. When the charcoal, which had been used in all three experiments, was deflagrated with nitrate of potash, and the saline mass dissolved in water, a very small residue only was obtained; which, moreover, was only partially soluble in muriatic acid. It, therefore, appeared to be improbable, that a salt of lime should be extracted out of it by means of a solution of corrosive sublimate, rather than by means of muriatic acid. And, moreover, if this even had been the case, the contained calcareous salt would have been removed after I had three times treated the charcoal with corrosive sublimate. The

calcareous salt, therefore, must have originated either from the water, or from the vessels, in which the fluid had been evaporated. In fact, after an equal quantity of water had been evaporated in a porcelain capsule, to a few drops, and only one drop of muriatic acid added, I obtained distinct evidence of the presence of lime on the addition of oxalate of ammonia. Moreover, as charcoal also precipitates substances, where the precipitation cannot depend on the presence of calcareous salts, as in the case of iodine, it is very improbable that the effect on metallic salts depends on the calcareous salts.—*Phar. Jour.*, from *Ann. der Chemie*.

ART. XLI.—ANIMAL CHARCOAL AN ANTIDOTE TO POISON.

ON Monday, November 17th, 1845, Dr. A. B. Garrod read a paper before the Medical Society of London, on Animal Charcoal as an Antidote to various Poisons, especially those derived from the animal and vegetable kingdoms. The following is an abstract of the paper, which will appear in the forthcoming volume of the Society's Transactions :

Dr. Garrod first noticed the experiments which had of late been made on the effects of animal charcoal in removing bitter principles from their solution, and then detailed his own experiments which led him to use it as an antidote. The results he had arrived at were,

1st. That animal charcoal removed the active principles from vegetable and animal substances when added in proper quantities, even in a solution, imitating the gastric juice, and at the temperature of the stomach (100° Fahr.)

2d. That animal charcoal will also form compounds with arsenious acid and other mineral substances, removing these

from their solutions, and that it is quite equal, if not superior, to the hydrated sesquioxide of iron, as an antidote to arsenious acid.

3d. That the compounds of the animal charcoal with the poisonous principles have no injurious action on the animal body, and therefore, when the charcoal is given with the poison, or before it has become absorbed into the system, it will act as an antidote.

4th. A certain amount of the antidote is required, depending on the quantity of active principle contained in the poison; half an ounce is more than sufficient for twenty grains of nuxvomica, or one grain of strychnia; if less is given, the poison may act by its excess above the antidote.*

5th. The antidote is peculiarly adopted to poisonous substances whose activity depends on a small quantity of an active principle as opium, nuxvomica, the aconites, belladonna, stramonium, tobacco, hemlock, &c.

6th. The antidote itself may be given to almost any amount as it exerts no injurious action on the body.

7th. That it is of great importance that good animal charcoal should be used, not the bone or ivory black, which contain about $\frac{1}{10}$ of earthy matter, but the *carbo animalis purificatus* of the London Pharmacopœia. Common bone black was found to be very far inferior, certainly not possessing a fifth of the antidotal power. The vegetable charcoal was comparatively inert.

Dr. Garrod proposes, that in cases of poisoning we should remove as much of the poison as possible by means of the stomach-pump or emetics, and then give a large quantity of the animal charcoal diffused in warm water, or the antidote may be given with the emetic, but ipecacuanha must not be used, as the charcoal would destroy its emetic property. Sulphate of zinc or some other mineral emetic should be chosen. Dr.

*If animal charcoal precipitates strychnia, morphia, &c., it must be a source of considerable loss to the manufacturer of quinia, morphia, and other alkaloids and bitter principles.—[Ed. Am. Jour. Pharm.]

Garrod also suggests that perhaps animal charcoal would prevent the action of the poison of rabies, syphilis, serpents, &c., if applied in the form of a poultice to the part which has come into contact with the poisons, and that it may prove serviceable as a remedy in some diseases, from its great power of absorbing all principles.—*Pharm. Jour.*

ART. XLII.—ON THE ACTION OF BITTER ALMONDS, THE LEAVES OF THE CHERRY-LAUREL, PEACH BLOSSOMS, AND THEIR DISTILLED WATERS. ON ESSENTIAL OILS, AND AROMATIC SUBSTANCES IN GENERAL.

By M. MAHER.

THE notice already taken of the disappearance of the smell of musk in syrup of orgeat, as established by M. Soubeiran, and recognised afterwards in the case of cherry-laurel water, by M. Fauve, of Bordeaux, led me to generalise this action upon essential oils, and all strongly scented substances.

Without being able to add to the stores of science anything as to the cause, the experiments I am about to mention may be of interest, if it were only to point out a quick and easy method of cleansing and rendering fit for any use, bottles, or vessels of any kind, which can, in many cases, only be used for the substances by which they were infected.

Very lately I wished to avoid the trouble of the sweetening, always imperfect and disagreeable, of a marble mortar I had used for the preparation of an assafœtida lotion, by means of vinegar and afterwards of ashes. I thought of trying the residuum of some almond paste, which I had

just employed in the preparation of orgeat; and having taken a portion and rubbed my mortar with it, as the smell still remained, I added a little water, when a strong odour of bitter almonds was perceptible; I rubbed it again, washed it with a quantity of water, and the smell had completely disappeared.

The first attempt induced me a few days afterwards, to apply the same plan to phials and bottles which had held camphorated eau-de-vie, oil of spike, essence of cloves, peppermint, orange, lavender, lemon, and turpentine, and the oils of petroleum, copaiba, cod's liver, creosote, and a number of odoriferous, balsamic, and resinous substances.

All these bottles were cleansed, without smell, and as if new.

But it was necessary, in the first instance, to remove the grease from those which were oily, by means of pearlash or potash, and to rinse those which contained resinous and balsamic tinctures, with alcôhol, before you used the almond paste. It is clear that pure bitter almond paste, without sweet almonds, would succeed better when used in the same quantity; but the article usually sold will not succeed so well, as much, frequently, on account of its age as of its having been adulterated with bran, flour, &c.; but fresh cakes of bitter almonds may easily be procured and pulverised for the purpose.

The leaves of the cherry-laurel, and of the peach, if bruised, and reduced to a pulp, and introduced into the bottles, act in the same manner. A handful of these leaves, rubbed upon the sides of a mortar, or any other scented vessel, have, using a little water, succeeded with me as well as bitter almonds.

The distilled waters of bitter almonds, cherry-laurel, and peach, especially if they are recent, have the same effect if the same precautions are used, but it is more expensive to employ them.

It must be the same in the case of all seeds, flowers, or

leaves, that contain hydrocyanic acid, even with other odoriferous substances that have not as yet been experimented on. This explains the common practice of applying laurel-leaves to new jars and other vessels, either by placing them in an oven, or boiling them in water.

After these trials I think I may assert that the paste of bitter almonds, or a pulp of the flowers of the laurel or the peach, may become applicable to the preservation of fish and meat during their transport, and act as a condiment to them; that their distilled waters may improve the smell in dissecting amphitheatres, newly painted apartments, and rooms in hospitals. I am above all convinced of their success in removing the musty smell from vessels, and even barrels, by giving them some time to act, and frequently agitating them on account of the porous nature of the wood.

It remains now to be ascertained whether the action of hydrocyanic acid can or cannot modify the medical properties of odorous substances; it is the business of medical men to ascertain whether they ought not to suppress cherry-laurel water and syrups of orgeat, in draughts, containing distilled waters or aromatic substances.—*Chemist, from Journal de Chimie.*

ART. LXIII.—CHEMICAL INVESTIGATION OF THE RED
POPPY, (FLOR. PAPAVER. RHÆAD.)

BY LEO MEIER.

THE author found in the poppies, vegetable albumen, gum starch, rhæadic acid, papaverate of lime, cerine, a soft resin, a fatty oil, wax and woody fibre; and in the ash, chloride of

calcium, chloride of potassium, sulphate of potash, sulphate of lime, phosphate of magnesia, phosphate of lime, carbonate of lime and magnesia. Betz and Ludwig mention the occurrence of malic and gallic acid, but this the author is inclined to doubt. The colouring principle of the flowers consists, according to the author, of two acids, one of which he calls *rhœadic acid*, the other *papaveric acid*.

To obtain the rhœadic acid pure and unaltered, a solution of acetate of lead is poured into a hot concentrated aqueous extract of the flowers; the precipitate which forms is carefully washed, alcohol of 0.889 sp. gr. added to it, and as much sulphuric acid as to leave a portion of the precipitate undecomposed, and the whole heated to boiling. The filtered solution leaves on evaporation a brilliant red amorphous mass, which is dissolved in water, and again precipitated with a solution of acetate of lead. The precipitate is washed with hot water, in which the papavate of lead dissolves, and the residue is then again decomposed with sulphuric acid. This operation is repeated until the liquid above the lead precipitate no longer exhibits any colour. This is more quickly effected by boiling the aqueous extract of the poppies with carbonate of lead, and decomposing the rhœadate of lead with sulphuric acid. On attempting to separate the acid from the lead by sulphuretted hydrogen, it is altered.

Pure rhœadic acid is a shining dark red amorphous mass, void of odour, and of a pure acid taste: on exposure to the air, it slowly absorbs moisture without deliquescing. It has a strong acid reaction, is insoluble in ether, soluble in cold absolute alcohol and cold water. A grain of the acid imparts a red colour to an ounce of water. If the acid is not free from papaveric acid, a reddish-brown residue is each time left on evaporation and re-solution. The acid yields, with a solution of sugar of lead, a bluish-gray precipitate; the same with acetate of copper; a dark turbidness with perchloride of iron; a dark colour with caustic and carbonated alkalies, and a yellow colour with dilute nitric acid. Nitrate of silver, tincture

of galls, solution of gelatine, dilute sulphuric and muriatic acid, produce no effect. The salts of rhœadic acid are of a brownish, bluish-gray or violet colour, have no smell, and are most of them tasteless, amorphous, and all of them insoluble in absolute alcohol. The acid is not altered by exposure to the air and light, nor by hydrogen gas, although in the decomposition of the lead salt it acquires a brick-red colour. On treating the solution with chlorine, it becomes yellow, and leaves on evaporation a slight residue. When rhœadic acid is boiled with dilute nitric acid, it assumes a yellow colour, without any evolution of gas taking place. After a time some minute crystals are deposited, and there remains, on removing the nitric acid, a yellowish-brown residue, which yields a brown precipitate with a solution of acetate of lead. Concentrated sulphuric acid, and also excess of caustic potash, convert the acid into a blackish-brown mass, which dissolves in a solution of potash. When rhœadic acid is heated over a spirit-lamp on platinum-foil, it puffs up, and is carbonized without inflaming; on dry distillation, it yields an acid liquid and an empyreumatic oil.

Papaveric Acid.—To obtain this acid as pure as possible, the extract of flowers of poppy, prepared with hot water, is digested with carbonate of lead. The liquid filtered from the rhœadate of lead is violet, has neither taste nor smell, is neutral towards vegetable colours, and contains no oxide of lead. Oxalic acid produces no precipitate in it, although lime is detected in it on reducing it to ash. Some sulphuric acid is added to the concentrated liquid, when some gypsum separates; it is evaporated to dryness, and the residue treated with alcohol of 60 per cent. The rose-coloured alcoholic extract leaves the acid on evaporation as a shining amorphous mass, of a beautiful red colour. It is deliquescent, has no smell, a slightly acid taste, is not soluble in ether and absolute alcohol, but readily so in spirit and water. Its solution is not rendered turbid by acetate of lead, neutral acetate of copper, nitrate of silver and perchloride of iron; alkalies, barytic and lime-

water, and protochloride of tin, colour it violet; dilute acids do not alter it. Its salts are brown, amorphous, have neither taste nor smell, are soluble in water, and most of them soluble in spirit of 0.912 sp. gr. The acid can be separated from all of them, if they had been rapidly evaporated *in vacuo*, by dilute sulphuric acid; but if slowly at a gentle heat, the salts assume a black colour, leave on solution a black residue, and yield on the addition of sulphuric acid the papaveric acid with a yellowish-brown colour. If a few drops of dilute sulphuric acid are added to a solution of papaveric acid, a dark sediment subsides, which is also formed by the action of acetic acid.

Chem. Gaz from Buch. Rep.

ART. XLIV.—CHEMICAL EXAMINATION OF THE INNER
BARK OF THE ELDER TREE, (SAMBUCUS NIGRA.)

By H. KRAMER.

THE central green bark of the elder has an odour similar to the leaves of this tree, and a disagreeable bitter taste. The brown decoction is rendered darker by ammonia, yields a black precipitate with protoperchloride of iron, a white precipitate with acetate of lead and a solution of corrosive sublimate, and a dirty white precipitate with nitrate of silver. Tartar-emetic only produced a turbidness after some time; chloride of barium and oxalic acid gave slight white precipitates. The water distilled over the fresh bark somewhat resembled in smell the *Aq. Cort. Viburn.*, and faintly reddened litmus-paper. By digestion with carbonate of baryta and evaporation, a salt was obtained which possessed all the properties of viburnate of baryta already described by the author.*

*Viburnic acid likewise occurs, according to the author, in the *Flores Sambuci*. It is combined in the *Aqua Sambuci* with ammonia, and occurs with essential oil and carbonate of ammonia. [This viburnic acid has been proved by Monro to be nothing more than valerianic acid. See p. 9 of the present volume.—Ed. *Chem. Gaz.*]

The water which escapes on evaporating the saline solution, still contained slight traces of an essential oil. Triturated with water and pressed, the bark yielded a clear liquid, which on boiling deposited flakes of albumen.

The ethereal extract of the bark, dried in the water-bath, possessed a beautiful green colour, and yielded on evaporation a green smeary mass, from which water extracted a small quantity of a tannin yielding a black precipitate with iron. Cold alcohol dissolved the mass with the exception of a green soft substance; an alcoholic solution of acetate of lead was mixed with this solution, the bright green precipitate collected on a filter, and the filtered liquid freed from excess of lead by sulphuretted hydrogen. On evaporation, it left a light brown transparent resin, which dissolved readily in ether, sulphuret of carbon, oil of turpentine and oil of almonds; less readily in alcohol, from a boiling saturated solution of which it is again partially deposited on cooling in the form of a powder. The solution has a bitter irritating taste; it does not redden litmus. It does not dissolve in acetic acid, nor in solution of ammonia or potash, and consequently belongs to the perfectly neutral resins. The lead precipitate was treated with alcohol and sulphuretted hydrogen. The filtered solution yielded on evaporation a dark brown smeary mass, of a disagreeable odour, which melted when warmed and stained paper. It dissolved readily in ether, sulphuret of carbon, fat and essential oils, and with tolerable ease in alcohol, which solution reddens litmus. On saponifying this fat, and then decomposing it with sulphuric acid, it diffused the disagreeable odour more distinctly. On combustion with nitre, it left a saline mass, which gave a precipitate with chloride of barium after saturation with muriatic acid, and consequently contained sulphur, which could not have arisen from the treatment with sulphuretted hydrogen. The portion of the ethereal extract which would not dissolve in cold alcohol contained wax and chlorophylle.

The alcoholic extract of the bark was of a light brown

colour, had an acid reaction, and left a brown transparent hygroscopic extract, soluble for the greater part in water. The tannic acid contained in it was precipitated by a solution of acetate of lead, the excess of lead removed by sulphuretted hydrogen, the liquid filtered and evaporated. In this extract grape-sugar was detected by the potash and copper test, and in the ash carbonate of potash. To determine the acid combined with the potash, the lead precipitate was boiled with water and filtered hot, when, on cooling, crystals of malate of lead separated. The portion of the alcoholic extract insoluble in water contained the above-described mixture of resin and fat.

The cold infusion of the bark was of a light brown colour, tasteless, and yielded on evaporation a transparent light brown mass, which on treatment with boiling alcohol became nearly colourless. It dissolved in a little water to a colourless liquid, which exhibited the reactions of Liebig's mucilaginous gum. It left on combustion a small quantity of carbonate of lime, which was probably contained in the plant as malate of lime. The extract remaining after evaporation of the alcoholic solution had a bitter taste, and gave precipitates with acetate of lead, nitrate of mercury and silver.

The extract obtained with dilute muriatic acid was reddish-brown: it was evaporated in the water-bath to the consistence of thin honey, and alcohol added to it, which precipitated brown mucilaginous flakes. These, after being well-washed with alcohol, were tasteless, and behaved precisely like the artificial gum which is formed on treating amylaceous plants with muriatic acid. Evaporated to dryness and extracted with water, the alcoholic solution, which contained some tannic acid, deposited a sediment of extractive. The ash of the muriatic extract consisted of chloride of calcium, sulphate and phosphate of lime, magnesia and chloride of potassium.

The alkaline decoction of the bark was evaporated in the

water-bath, and then treated with acetic acid, which produced a flocculent brown precipitate, from which boiling acetic acid removed coagulated vegetable albumen, leaving a residue of pectine.

According to the experiments of the author, the central bark of *Sambucus nigra* contains viburnic acid, traces of an essential oil, vegetable albumen, a neutral resin, an acid sulphurous fat, wax, chlorophylle, tannic acid, grape-sugar, gum, extractive, starch, pectine, malate of potash, malate of lime, sulphate of potash and lime, chloride of potassium phosphate of magnesia, lime, silica, and peroxide of iron.—*Chem Gaz., from Archiv der Pharm.*

ART. XLV.—ADULTERATION OF IODIDE OF POTASSIUM BY MEANS OF THE BROMIDE; THE MEANS OF DETERMINING THE AMOUNT OF THE LATTER IN THE COMPOUND.

By M. PERSONNE.

THE adulteration of iodide of potassium by the bromide of the same base, being a known fact, we thought it would be useful to publish the following process, by means of which we can not only ascertain the presence of these two products in the compound, but also determine the relative proportions of each.

When we treat a solution of iodide of potassium with sulphate of copper, we know that a protoiodide of copper is immediately precipitated, and that consequently half the iodine of the iodide remains in solution, notwithstanding the excess of sulphate that has been added.

M. Duflos has shown that we can precipitate the whole of the iodine in the solution in the state of protoiodide of

copper, if we add an excess of sulphurous acid, which, acting in concert with the iodine, reduces the binoxide of copper to the state of protoxide, by itself passing into the state of sulphuric acid.

As the same reaction does not take place in the case of the chlorides, this method has been applied to the discovery of chloride of potassium in the iodide; it remained to be seen whether it could also be employed for the detection of bromide in the same salt, I have satisfied myself by accurate experiment that it is equally correct as in the last case.

The operation is performed in the following manner:—We dissolve the suspected iodide in a sufficient quantity of cold distilled water, we add an excess of sulphate of copper in solution, we then saturate the mixture with sulphurous acid; as soon as the latter is in excess, the whole of the iodine is precipitated in the state of protoiodide of copper; while the bromide remains undecomposed, we separate the iodide of copper by filtration, and it may be weighed after being washed and dried. The water arising from the washing is to be added to the filtered liquid, we add a fresh quantity of sulphate of copper and sulphurous acid and boil the mixture; the whole of the bromide is then decomposed in its turn, and the bromine precipitated in the state of proto-bromide of copper, the quantity of which can be determined as in the first instance.

If we should be content with the determination of the presence of bromine in the compound, it is sufficient, after having separated the iodide of copper by filtration, to place the liquid in a tube, pour upon it a little ether and chlorated water, then shake it, and, if left at rest, the ether will rise to the surface, bringing with it the whole of the bromine, which tinges it of a reddish-yellow colour.

This method, by its simplicity and accuracy, is preferable to that which consists in converting the mixture into iodide and bromide of silver, which are afterwards separated by ammonia; for the latter process almost always gives incorrect results.—*Chemist, from Journ. de Pharm.*

ART. LXVI.—ON THE EMPLOYMENT OF THE OXALATE OF ALUMINA IN THE MANUFACTURE OF CANE AND BEET-ROOT SUGAR.

By. M. MIALHE.

IN the course of my researches on digestion and assimilation I have frequently had occasion to observe the energetic action which the caustic or carbonated alkalies exert on glucose, as well as on cane and beet-root sugar, modified by acids or merely by the simple action of heat—a chemical action to which M. Peligot has directed the special attention of chemists and manufacturers. My observations have led me to reflect on the serious inconveniences which must necessarily result from the use of milk of lime in the clarification of sugars. “All the efforts of the manufacturer,” says M. Dumas, “should be directed towards improving the mode of clarification, by avoiding as much as possible the use of sulphuric acid, which destroys the crystallizable sugar, and the use of the lime itself, which always imparts a urinous taste to the secondary products, and decreases their value.” But can the employment of lime be suppressed in the clarifying of sugars? I think not. How then shall we proceed?

The first condition is to get rid of all the lime after clarification by means of some chemical agent, which itself is without action on the sugar. Animal charcoal answers but imperfectly; the employment of the oxalate of alumina, which I propose to substitute for it wholly or in part, admits of solving this important problem in a most satisfactory manner.

In explaining the theory of the action of the oxalate of alumina, I may call to mind,—1st, that cane or beet-root sugar, dissolved in lime-water and evaporated to dryness, does not become coloured during evaporation; 2d, that glucose and cane-sugar, after having experienced the

action of acids or an elevated temperature, both acquire under the same circumstances a very marked brownish-red colour. From these facts it follows, that if the cane or beet-root sugar submitted to evaporation contains at the same time glucose, or modified cane-sugar and lime, the product will necessarily be coloured; this is precisely what happens daily in practice. Now I propose to avoid this serious inconvenience by means of the oxalate of alumina. It suffices for this purpose to add to the saccharine solution containing lime a suitable quantity of hydrated oxalate of alumina; the lime is immediately precipitated in the state of oxalate, and the alumina set free subsides in its turn, carrying with it in combination all the colouring matter existing in the mixture—a twofold advantage, the value of which will be readily appreciated.—*Chem. Gaz. from Comptes Rendus.*

ART. LXVII.—NEW PROCESS FOR THE DETECTION OF ARSENIC IN ORGANIC MIXTURES.

By H. LEIGHEY, M. B.

THE author found that Reinsch's process was neither certain nor delicate; it was true that the copper would withdraw every and the smallest trace of arsenic; but when this quantity was minute, it was by no means easy to detect it afterwards. The author, therefore, reflecting upon these circumstances and upon the exceeding delicacy of Marsh's test, was led to believe that if some other metal were used, which like copper not only had the faculty of withdrawing the poison, but would also serve for the generation of hydrogen, he might be able to combine the advan-

tages of both the tests, and at the same time avoid their impediments. He found that zinc possessed such a property, removing every trace of arsenic from an organic fluid, and forming an alloy from which arseniuretted hydrogen could be developed with the greatest facility. To apply this method :—The organic liquids are to be slightly acidulated with nitric acid, adding about 10 drops to the ounce, filtered, strained through linen or muslin, and introduced into a flask with about 2 drms. of granulated zinc. The whole is kept boiling for half an hour, not too rapidly, and the mixture is kept acid by the occasional addition of a drop or so of nitric acid; during this time the arsenic will be precipitated on the zinc, giving it a grayish-black appearance. The zinc is then removed, and repeatedly washed with boiling water to remove all organic matter. If the substance is solid, as the liver, intestine or muscle, it must be previously cut up into small pieces and placed in a porcelain dish, then covered with a mixture of 2 parts of muriatic to 1 of nitric acid, and evaporated to dryness, taking care that it does not boil very rapidly; thus the tissue will be destroyed and the arsenical compound converted into arsenic acid. The charred mass containing it is broken up, boiled in two or three successive portions of water, filtered, and having ascertained that the mixed liquids are acid, introduced into a flask with the zinc as above.

The second stage of the process consists in introducing the zinc with some dilute sulphuric acid into an apparatus modified from that of Marsh. It differs from the latter in the lower curved portion being again curved in the centre, but in the opposite direction, thus forming an undulating portion consisting of three curves in the same plane, the two lateral of which have the convexity directed downwards, that of the centre being upwards. Near the summit of the longer limb, as usual, there is a bulb; the shorter limb has two bulbs, one large and close to the bottom, the

other a little above it; the first serves to hold the zinc, the second to break any bubbles which may arise. The central curve just spoken of, and the convexity of which is directed upwards, serves to prevent the gas from backing and escaping through the longer limb, and to prevent the zinc from falling into the tube below the lowest bulb in the shorter limb; a pointed piece of glass-tubing, loosely fitting the lower part of the shorter limb, should be placed in it. A cap, into which a stop-cock screws, is cemented to the upper part of the shorter limb, and two pieces are to be ground into the upper opening of the stop-cock, and so adapted that they may be removed at pleasure. One of these pieces is a jet for burning the gas; the other, a right-angled tube, to which another of Berlin glass, 6 inches long and $\frac{1}{8}$ th of an inch in bore, can be connected by means of caoutchouc or bladder; to the other end of this another right-angled tube is adapted, and its lower limb made to dip into a solution of nitrate of silver. When used, the arsenicated zinc is introduced into the bulb, the stop-cock screwed on, and the right-angled tube fixed on. Dilute sulphuric acid, of spec. grav. 1080 (1-7,) is then added, when the gas is evolved, and must be transmitted slowly through the solution of nitrate of silver until it begins to blacken it; the stop-cock is then turned, the right-angled tube removed, and the jet substituted. The ordinary tests may then be applied.

The solution of nitrate of silver may also be tested by precipitating with slight excess of muriatic acid, gently boiling for a short time and filtering. Evaporate the filtered liquid to dryness, then redissolve the residue in a little distilled water, neutralize with a drop of ammonia, and make it boil so as to expel any excess of the latter. On testing with nitrate of silver, the arseniate is deposited if arsenic had been present; while there is no change, or but a white cloudiness, if it had been antimony or sulphur.

The only impediment the author has found to this process

is, that a salt of mercury gives a mercurial coating to the zinc, and thus prevents the deposition of the arsenic, and the subsequent action of sulphuric acid upon it. It must however exist in very considerable quantity to offer any serious impediment.

The fallacies most likely to be met with are antimony and sulphur, both of which give a dark coating to the zinc, and evolve a gas which has the power of blackening the nitrate of silver; but these fallacies are completely guarded against in the subsequent stages of the process.

This test acts in water containing $\frac{1}{200000}$ th part of arsenic, and it is not difficult to discover the $\frac{1}{200}$ th of a grain even when mixed with many ounces of organic matter, and by careful management it is possible to detect a much smaller quantity.

The principal precautions requisite to be attended to in applying this method are, that the solutions be not boiled too rapidly, that enough zinc be used to precipitate the whole of the arsenic in a thin film, that the suspected fluid be never made so acid as to act upon the zinc and liberate a gas, that the zinc be very carefully washed before being introduced into the hydrogen apparatus, that the reduction tube contain no lead, and of course that the zinc and sulphuric acid be pure.—*Chem. Gaz.*

ART. XLVIII.—METHOD OF EXTRACTING THE IODINE AND BROMINE CONTAINED IN THE SALTS AND MOTHER-LIQUOR OF KELP SODA.

THE Société d'Encouragement, in its general meeting of the 5th June, 1839, decreed a gold medal to Messrs. Delaunay, Couturier and Villiedieu, of Tcurlaville, near Cherbourg, for their processes for extracting iodine and bromine from soda obtained from the sea-weed, which is gathered in large quantities on the shores of Brittany.

The importance of this manufacture was made known in a report inserted in the 'Bulletin' of August, 1839; but it did not contain a description of the process. We will, therefore, make up for this omission, by giving an extract from the patent for ten years, taken by Messrs. Couturier, on the 22nd May, 1835, and which has now become public property.

1st. *Extraction of Iodine from Kelp Soda.*—The mother-waters of this soda having been concentrated to the greatest possible degree, are left in any suitable vessel, in order to allow the salts, which may be separated during its slow crystallization, to deposit; they are afterwards drawn off, and the small quantity of alkaline carbonate, which is always contained in these mother-liquors, is saturated by means of sulphuric acid. In order to be certain that the free alkali of the mother-liquors is saturated, the point of saturation must be slightly exceeded, which is ascertained when, after having sufficiently agitated the mother-liquor to which the sulphuric acid has been added, a strip of litmus paper plunged into it is slightly reddened.

It often happens that the mother-liquors of kelp contain a considerable quantity of hyposulphites which precipitate sulphur, and by the decomposition of which sulphurous acid is disengaged; in this case sulphuric acid is added, by

small quantities at a time, until no more sulphur is precipitated. This clarified liquor is put into large vessels, which must not be quite filled, to allow the liquor to be stirred from time to time.

The bottles having been placed upon a table, a current of chlorine gas is directed to the bottom of the liquor they contain. This gas must not be disengaged too rapidly, otherwise a great part of it will be lost by traversing the liquor without being dissolved: attention to this is also necessary, in order to ascertain when to stop. It is important that the liquor should be agitated as often as possible, to enable it to combine with the chlorine gas which accumulates in the empty part of the bottles.

The chlorine gas, which is mixed with these mother-liquors, acts first upon the bases of the iodides, saturates them, and separates or precipitates the iodine; this latter appears at first in the form of a reddish substance, which thickens the liquor, but it soon forms into brown flakes, which fall to the bottom. When the liquor appears no longer to be coloured red, a small quantity must be poured into a glass, and left for a time to allow the iodine floating therein to settle; after which a few drops of concentrated solution of chlorine are poured into the clarified liquor: the passage of the chlorine must be discontinued as soon as the solution ceases to thicken the mother-liquor, which, on being left in a quiescent state, allows the iodine to settle at the bottom in the form of a thick layer of brilliant brown flakes.

If the iodine is required in large flakes, the supernatant liquor may be decanted off immediately, and washed in a small quantity of cold water; it is then to be put into a retort of glass or porcelain, and sublimed; a long tube of glass, of sufficiently large diameter, being adapted to the neck of the retort. The iodine is volatilized by the heat in the form of violet coloured vapors, which are first condensed in the neck of the retort, and afterwards in the tube, in the form of small plates or flakes, having a metallic lustre

When the vapours cease to be perceptible, the operation is completed ; care must be taken to keep a cloth constantly wetted with cold water upon the whole surface of the tube. In working on a large scale, the products of several operations are united, left to drain, and sublimed as above described.

2nd. *Extraction of the Bromine from Kelp Soda.*—The mother-liquor having been completely exhausted of iodine, is introduced into a tubular retort until it is half-full; powdered peroxide of manganese and concentrated sulphuric acid of commerce are to be added to it, and an apparatus composed of three recipients, which communicate by means of pipes ground with emery, is adapted to the neck of the retort : the distillation is then proceeded with, care being taken not to let it boil too fast. The bromine which is separated by this operation is volatilized and disengaged in the form of gold-coloured vapours, which are partially condensed in the neck of the first receiver in the form of streaks and drops of a reddish-brown liquid, which run down by degrees into the receiver ; but as a considerable quantity of water is volatilized at the same time, it is condensed also, and floats upon the bromine, which occupies the lowest part of the liquor. When the coloured vapours cease to be disengaged from the retort, the fire is removed ; a fresh quantity of peroxide of manganese and sulphuric acid are then added, the retort is closed, and the fire again applied. If a sufficient quantity of these substances has been added at first, all the bromine will have been extracted ; it then only remains to collect that which is below the liquor condensed in the receiver ; this is done by means of a glass funnel furnished with a cock. When the separation is well effected, the end of the funnel is placed in a bottle, the cock is gently opened, and the bromine runs into the bottle ; the cock is shut the instant all the bromine has run through and the water is about entering. This water holds a considerable quantity of bromine in solution, which

is separated from it by collecting the residuum and saturating it with a sufficient quantity of potash. The product of this saturation is afterwards evaporated to dryness, and the residue is calcined at a dull red heat with a small quantity of coal-dust; it is then dissolved in just a sufficient quantity of water; the solution is filtered and treated in the apparatus with peroxide of manganese and concentrated sulphuric acid, as above described.

The bromine thus obtained is rectified by distillation,—*From the Bulletin de la Société d'Encouragement, as inserted in the London Journal of Arts.*

ART. XLIX.—OBSERVATIONS ON MYRRH, AND ON A METHOD OF DISTINGUISHING IT FROM BDELLIUM.

BY L. F. BLEY AND E. DIESEL.

THE extremely different amount of essential oil obtained from myrrh, varying between 3.60 and 3.10 per cent., depends, according to the authors' observations, on the oxidation of the essential oil. Myrrh, which contains but little of this oil, always exhibits a strongly acid reaction, which is never found in that containing a greater proportion. Humidity especially favours the oxidation, and the moistening myrrh with alcohol to give it a better appearance should be entirely dispensed with. In the preparation of the essential oil, the water freed from the oil is found to have a strong acid reaction. This was saturated with carbonate of lime mixed with acetate of lead, evaporated, and treated with absolute alcohol, when formiate of lead was precipitated. This salt was decomposed by means of phosphoric acid, and the presence of the formic acid confirmed by the tests with per-

chloride of iron. The essential oil of myrrh gradually acquires an acid reaction by exposure to the air, becoming at the same time thickened to a turpentine-like mass. The residuary balsam-resin dissolves readily in ether, alcohol and oil of turpentine, has at first a slight, subsequently a strong bitter taste, and melts readily on the application of heat. The oil of myrrh is probably a carburetted hydrogen of similar constitution to the oil of turpentine. Benzoic acid is said by Brandes to occur in myrrh; the free acid, however, which he considered to be benzoic acid, appears to be nothing more than formic acid.

Pseudo-myrrh, which has been frequently found mixed with the genuine myrrh, consists of large pieces of different forms, the majority of them seeming to be fragments of a cylindrical body; they are coated externally with dust, and have a dirty reddish-brown colour; the surface of fracture is tolerably even, of vitreous lustre, brownish-yellow colour, and nearly as transparent as Senegal gum. It has a faint myrrh-like odour, and a disagreeable bitter, somewhat balsamic taste. Nitric acid dissolves it to a bright yellowish liquid, from which water separates small yellowish particles. Genuine myrrh yields with nitric acid a transparent dirty yellow liquid. *Bdellium indicum* is not dissolved by nitric acid; it softens, becomes whitish and opaque. Bibulous paper, moistened with the alcoholic extract of myrrh and then with nitric acid, acquires the blood-red colour first observed by Bonastre; *bdellium* and pseudo-myrrh exhibit only a yellow or brownish colouring. *Bdellium indicum* is moreover distinguished by its greenish-brown colour, its more terebinthinate odour, and bitter and somewhat acrid taste. It becomes viscous when held for some time between the fingers. Myrrh yields a bright golden yellow tincture and an opaque whitish residue; pseudo myrrh a light yellow tincture and a semi-transparent residue; *Myrrha indica*, a dark yellow tincture and an opaque residue. An addition of water produces in the first and last a milky turbidness, and in the second no change. Nitric acid (6 drops to 20 of the tincture) yields with

M. electa a yellowish-white opacity, upon which after a time the periphery of the liquid acquires a bright violet colour, while the centre remains yellow. *M. indica* behaves similarly, only that the colour is darker; pseudo-myrrh does not exhibit this reaction. Fuming nitric acid produces with the tincture of *M. electa* an umber-brown, and finally a dark violet colour; on evaporation a dark gamboge-coloured residue is left; *M. indica* exhibits the same reaction; pseudo-myrrh experiences no change. *Bdellium indicum* and *africanum* are distinguished by their not assuming a violet colour on their treatment with nitric acid. About 10 grs. of myrrh, shaken with an ounce of water and filtered, yield with solutions of salts of oxide of lead a considerable precipitate. *Bdellium indicum*, treated in the same manner, exhibits scarcely any opacity.—*Chem. Gaz., from Archiv. der Pharm.*

ART. L.—ON THE EMPLOYMENT OF ESSENCE OF TURPENTINE AS A SOLVENT FOR CAOUTCHOUC.

By M. BOUCHARDAT.

ABOUT ten years since I was consulted by a manufacturer of waterproof fabrics, as to the best solvent for caoutchouc. At that time either essential oil obtained by distilling coal tar, or oil obtained by the open distillation of caoutchouc, was used in England.

I commenced by carefully studying the nature of this pyrogenous oil, and separated from it several kinds of carburetted hydrogen, remarkable by their point of ebullition being very low; I was not long, however, in being convinced, that if pyrogenous oil of caoutchouc is a good solvent of that substance, its cost will prevent its being for some

length of time employed. The essential oil, obtained by distillation from tar, has a disagreeable smell, from which it is so difficult to free the fabrics, that I determined to find, if possible, another solvent.

From the first I thought of a natural carburetted hydrogen (essence of turpentine,) which it is well known acts as a solvent of caoutchouc; I hoped that by modifying it by heat its solvent properties might be augmented—I was confirmed in this idea by experience. By distilling this essence openly, once or twice, a solvent is obtained which gives satisfactory results. I also remarked, that by effecting this distillation upon fire-brick, the essence being submitted to a higher temperature, a liquid was obtained which was very little inferior, as a solvent, to the pyrogenous oil of caoutchouc.

The manufacturer who had consulted me hastened to profit by the results which I had obtained, and having reserved the right of publishing them, I made them known in my treatise upon the products of distillation of caoutchouc, inserted in vol. 23 of the *Journal de Pharmacie*. Since that time, the essence of turpentine, modified by one or two open distillations, has been the solvent for caoutchouc employed by manufacturers of waterproof fabrics in both France and England.

The following are the physical properties possessed by essence of turpentine, obtained by open distillation upon fire-brick. Its colour is yellowish; its smell partakes of that of thyme, oil of naphtha, and essence of turpentine; it is lighter than the essence from which it was made, in the proportion of 0.8726 to 0.8420. Its boiling point is 185° F.; but the temperature rises immediately afterwards to 310°, and remains stationary at that point. I have inquired whether it was not possible to isolate the former more volatile portions; but, notwithstanding great care and the best refrigerating mixtures, I have only been able to separate a very small portion, insufficient for useful examina-

tion. In general the improved essence has been found to boil at 310° , whilst before its distillation its boiling point varied from 312° to 316° F. I analysed the modified oil, and found that its composition was exactly the same as that of the primitive essence.—*Chemist, from Bulletin du Musée de l'Industrie.*

ART. LI.—PATENT GRANTED TO J. B. GREGSON, DUNSTON, DURHAM, FOR IMPROVEMENTS IN THE MANUFACTURE OF EPSOM SALTS AND CARBONATE OF LIME, COMMONLY CALLED PRECIPITATED CHALK, PARTS OF WHICH IMPROVEMENTS ARE APPLICABLE TO OTHER PURPOSES.

THESE improvements in the manufacture of epsom salts are two in number, and consist,—1st, in the application of sulphuric acid to dolomite or magnesian limestone in the uncalcined state; and 2d, in the application of muriate of ammonia to remove the lime from the mixed hydrates of lime and magnesia, obtained by thoroughly calcining and slaking dolomite.

The following is the mode of carrying out the first improvement:—The dolomite is reduced to powder, and made into a paste with water, in an open vessel lined with lead; then sulphuric acid, of 1.500 spec. grav., is added in the proportion of 350 lbs. of the latter to 200 lbs. of the former, and the mixture is well-stirred. The sulphuric acid rapidly decomposes the dolomite, and carbonic acid gas is liberated; and when the effervescence ceases, a solid substance remains, composed of the sulphate of lime and magnesia; if desired, the carbonic acid gas may be collected for use, by mixing the sulphuric acid and dolomite in a close vessel.

The mixed sulphates are separated by diffusing the solid residuum in water, allowing the sulphate of lime to subside, and drawing off the supernatant liquid, which is a solution of sulphate of magnesia, (epsom salts,) containing a small quantity of sulphate of iron; this solution is freed from sulphate of iron by means of caustic lime or magnesia, and is evaporated and crystallized in the usual way. Or the mixed sulphates may be calcined in a reverberatory furnace for 3 or 4 hours, or until the whole of the iron is peroxidized; and when this has been done, the sulphate of magnesia may be dissolved out of the mass, and the clear solution evaporated and crystallized.

The method of operating according to the second improvement is as follows:—200 lbs. of muriate of ammonia are dissolved in 100 gallons of water, in an iron boiler, by the application of heat, and the solution is allowed to cool; after which 200 lbs. of thoroughly calcined dolomite are slaked with water, and put into an iron still (holding from 300 to 400 gallons,) connected with a Woulf's apparatus containing water; the solution of muriate of ammonia is then introduced, and a gentle heat applied to expel the ammonia, which is condensed in the Woulf's apparatus, and stored for use. When all the ammonia has come over, the residuum is withdrawn from the still, and the hydrate of magnesia thoroughly washed, to free it from muriate of lime. The magnesia is then saturated with sulphuric acid, the iron it contains is thrown down by means of caustic lime or magnesia, and the clear solution is evaporated and crystallized.

The improvements in the manufacture of carbonate of lime consist,—1st, in the application of carbonic acid gas to a solution of caustic ammonia and muriate of lime, and in the recovery of the muriate of ammonia for subsequent use; and 2d, in adding a solution of carbonate of ammonia (obtained by saturating a solution of caustic ammonia with carbonic acid gas) to a solution of muriate of lime.

With regard to the first improvement, the operation is

conducted in the following manner :—100 lbs. of muriate of ammonia are dissolved in 100 gallons of water, and the solution allowed to cool ; 70 lbs. of well-burnt lime are then slaked in water, and when cold stirred into a solution of muriate of ammonia in an earthenware vessel ; mutual decomposition immediately takes place, and muriate of lime and caustic ammonia are formed in the liquid. This solution is transferred to a cylindrical vessel, lined with lead, and containing an agitator covered with lead ; carbonic acid gas is then forced into the solution by means of a force-pump connected with the bottom of the vessel, and the agitator is kept revolving until the solution is entirely decomposed, which may be known by the smell of ammonia no longer arising. The vessel will now contain a milky fluid, composed of carbonate of lime and a solution of muriate of ammonia ; this fluid is removed, and allowed to settle ; the clear solution of muriate of ammonia is then decanted off, and the precipitated chalk well-washed and dried. The solution of muriate of ammonia may be again used.

The mode of carrying into effect the second improvement in the manufacture of carbonate of lime is as follows :—100 gallons of a solution of caustic ammonia, of 0.970 spec. grav., are introduced into a vessel similar to that last described, and capable of holding 120 gallons ; carbonic acid gas is then forced in, and the solution becomes thereby converted into a solution of bicarbonate of ammonia, which is run into a cistern containing 100 gallons of a solution of caustic ammonia, of the same specific gravity ; and a solution of carbonate of ammonia, of 1.050 spec. grav., is thus produced. This is mixed with a solution of muriate of lime, of 1.200 spec. grav., in the proportion of 2 parts of the former to 1 of the latter ; decomposition immediately takes place, and the whole becomes a gelatinous mass, which must be stirred until the carbonate of lime assumes the solid form. The mass is then allowed to subside, the clear solution of muriate of ammonia is drawn off, and the carbonate of lime is washed and dried.—*Chem. Gaz.*

MISCELLANY.

The action of Hydrocyanic Acid as a Poison. By Dr. MEYER.—The Doctor states as the result of his experiments with this acid on animals—

"1. That it had a paralyzing action on the peripheric nerves—i. e. it suppressed sensation and motion, and occasioned congestion, with augmented secretion, which was chiefly observed in the cavity of the mouth. 2. He found it to act only when received into the vascular system. On mechanically arresting the circulation, the poison did not act, although the integrity of the nervous system was preserved. On restoring the circulation, the operation of the poison was immediately observed. 3. Hydrocyanic acid does not act so rapidly as it was formerly believed. Its operation was never instantaneous. 4. Its fatal effect is owing to paralysis of the heart induced by the topical action of the blood, mixed with hydrocyanic acid, upon that organ. It required about thirty seconds for the poisoned blood to reach the heart and produce its paralyzing effects, and it mattered not whether the poison was applied directly to the substance of the heart, or to parts remote from it. In Dr. Meyer's opinion, prussic acid may act independently of the brain or nerves, or of their intervention. It requires for its operation, absorption and diffusion until it reaches the heart. It is owing to this, in his opinion, that amphibia are less rapidly killed by this poison than mammalia, the action of the heart in those animals being less necessary for the maintenance of life. Nevertheless, in a certain dose the poison may act upon and paralyze the nervous system, producing tetanic convulsions, congestion of the veins, and exudations in the serous cavities. It is not true, as it is generally believed, that in death from prussic acid the blood does not coagulate. Dr. Meyer found that this liquid coagulated in the bodies of the animals which were killed in his experiments."—*British and Foreign Review*.

These observations are to a certain extent confirmed by an experiment of Liebig. He endeavors to prove that prussic acid does not act by sympathy through the nervous system, nor is it absorbed directly into the blood; but that it can only act through the medium of its vapour on the pulmonary mucous membrane. If this statement be correct, it may be made to act as a poison, and yet with difficulty be discovered after death.—*Chemist*.

Novel application of Hydrochlorate of Morphine. By M. EHRLARD.—It is well known that all kinds of neuralgia, and more particularly odontalgia, are very difficult of cure, although they may be considerably modified by means of preparations of opium, and particularly hydrochlorate of morphine. M. Ehrard believes, that if this last substance is not more efficacious, it is because it is not properly administered.

In fact, hydrochlorate of morphine, according to M. Ehrard, should be applied to the gums by friction on the affected side. M. Ehrard asserts that this simple change in the mode of application will, in a short time, remove the most afflicting toothache.

The author makes several observations which appear to be decisive. It is particularly in the case of those who are feeble, delicate, and extremely nervous that this mode of treatment is successful, and in many cases the pain arising from carious teeth has disappeared as if by enchantment.

The following is the mode of proceeding adopted by M. Ehrard:—

The first day the patient takes 13 milligrammes of the medicament on one of his fingers, previously wetted, and he rubs the affected gum with it for the space of three minutes, he then holds his head on one side, taking care neither to spit nor swallow, to give time for the absorption of the salt; and afterwards he swallows his saliva.

At the end of two hours the operation is to be repeated.

On the following day, if the disease continues, we increase the dose, if necessary, to 37 milligrammes.

In frontal neuralgia, M. Ehrard employed hydrochlorate of morphine with the most marked success, by applying it to the mucous lining of the nostrils.—*Ibid*, from *Jour. de Chir.*

New mode of preparing Adhesive and Strengthening Plasters from India-rubber. By WILLIAM H. SHECUT AND HORACE H. DAY, OF NEW YORK.—The articles we employ in the preparation of the said plasters, are those known in commerce as caoutchouc, or India-rubber pine gum (obtained from the southern yellow pine, commonly termed "long leafed" pine,) cayenne pepper, balsam of Peru, litharge, and spirits of turpentine.

The proportions are five pounds India-rubber, reduced to fine shreds, steeped in soft water for softening it, then put, with sufficient quantity of spirits of turpentine to cover the India-rubber, in a vessel; the quantity to be increased as the gum soaks it up. When the rubber is sufficiently dissolved, it is pressed through a fine sieve. Four ounces of capsicum annum, or cayenne pepper, is heated in a quart of spirits of turpentine. A portion of this tincture is ground with a pound of litharge and then mixed with the remnant of the tincture, and to it is

added six ounces of the balsam of Peru. Then melt a pound of pine-gum, and add spirits of turpentine until it is thin enough to strain, and finally, all the preceding preparations are mixed together.—*Ibid*, from *Jour. de Phar.*

On a new Process for obtaining pure Chlorine Gas. By PROFS. R. E. ROGERS AND W. B. ROGERS.—This process is founded on the powerful oxidating action of chromic acid, especially when liberated in a solution, and consists in causing a reaction between hydrochloric acid and this substance, in which the chlorine of the former is set free. Our mode of proceeding is as follows:—

To 1 part of powdered bichromate of potash, in a small retort or flask, we add six parts of hydrochloric acid, of spec. grav. about 1.16, and apply a gentle lamp heat for a few seconds, so as to bring about a brisk reaction. The chlorine is now rapidly evolved, and continues to be disengaged as fast as is convenient, without requiring any further application of the lamp.

Referring to the composition of the bichromate of potash and of hydrochloric acid, it will be seen that 1 equivalent of bichromate of potash and 7 of hydrochloric acid, are capable of evolving 3 equivs. of chlorine, at the same time giving rise to 1 equiv. of the sesquichloride of chromium, 1 of the chloride of potassium, and 7 of water.

In order to ascertain how near we might approach to the equivalent quantity of chlorine above deduced, we resorted to the following method:—Knowing that a strong solution of chloride of sodium is much less absorbent of the gas than ordinary water, we prepared a quantity of saturated brine, through which we passed chlorine until the liquid appeared to be fully charged. With this we filled a tall graduated vessel, designed to receive the gas, and a porcelain bowl, which served as a pneumatic trough, and having placed 4 grms. of the bichromate with an excess of hydrochloric acid in a small retort, we passed the gas as it was evolved through the chlorous saline solution into the narrow graduated jar. After urging the process until the action entirely ceased and no further gas escaped, we measured the resulting gas with the usual precautions at 60°. Its volume was found to be 54.5 cubic inches. On repeating the experiment with the same amount of bichromate and acid, and with the same brine, we obtained in the second trial 55.5 cubic inches, and in the third 56.2 cubic inches of the gas, the increase being evidently due to the diminished absorption arising from the more complete saturation of the liquid with chlorine.

Taking 76.5 grs. as the weight of 100 cubic inches of chlorine at 60° F., the volume due, to the entire decomposition of 4 grms. of bichromate of potash is 57.3 cubic inches. It thus appears that, with proper

precaution, this process may be made to yield $\frac{5}{8}$ ths, or nearly the whole theoretical amount of the gas.—*Silliman's Journal*.

On the Preparation of crystallized Sulphuret of Calcium. By DR. E. RIEGEL.—The best process for procuring pure sulphuret of calcium is that recommended by Liebig, according to which 4 parts calcined gypsum, 1 part powdered charcoal, and $1\frac{1}{2}$ part meal, are kneaded with water to a paste, which is formed into pellets, which when perfectly dry are arranged with charcoal in alternating layers, and exposed to a red heat. On heating to redness a mixture of equal parts of hydrate of lime and sulphur, a preparation is obtained which contains a considerable quantity of sulphate of lime. On boiling 1 part hydrate of lime with $2\frac{1}{2}$ parts sulphur and 16 parts water for a length of time, the author obtained a brownish-yellow solution, from which on cooling some red acicular prisms separated. The crystals were quickly decomposed by exposure to moist air.—*Chem. Gaz. from Jahrb. für Prakt. Chem.*

Stopping for the Teeth. By M. BERNOTH, of Warasdin.

R Powdered mastic	90 grammes.
Sulphuric ether	40 "

Digest for several days, strain it through a cloth, then add native alum in fine powder, in sufficient quantity to form a plastic mass, with which small phials, holding 8 grammes, are to be filled, having first poured into each

Camphorated alcohol	2 grammes.
Essence of cloves	1 gramme.

This stopping introduced into the cavity of a carious tooth, first well cleaned and dried, is extremely useful on account of the great degree of hardness it acquires.—*Chemist, from Archiv. de Phar.*

Advantageous Method of preparing Gallic Acid. By F. MUELLER.—The author recommends Braconnot's method for preparing gallic acid, modified as follows. He boils 16 oz. of coarsely-pounded so-called heavy blue galls three times with 8 lbs. of water in a tin sauce-pan, strains the decoction, and lets it stand for 4 months in a covered earthenware pan, at a temperature of 100° — 122° , now and then replacing the evaporated water and well agitating. The mould, as well as the crusts which form, are after this time collected on a filter, slightly washed with cold water and dried, then boiled with 4 parts water, filtered, and the residue well washed with hot water. The crystals which separate from the filtered solution on cooling are sepa-

rated from the mother-ley, slightly washed, dissolved in a little boiling water, and set aside to crystallize. The crystallized acid is collected on a filter, rinsed once or twice with water, dried, then digested for several days with 3 oz. of alcohol and 1 oz. of purified animal charcoal, heated to boiling, filtered, and evaporated at a very gentle heat. The still slightly brownish crystals are again collected on a filter, rinsed with spirit, dissolved in 3 parts boiling water, and set aside to crystallize. The crystals obtained were now of a beautiful white colour, silky lustre, and perfectly pure. The mother-ley yielded on evaporation a small quantity of brownish-yellow crystals. The produce in beautiful white gallic acid amounted to $2\frac{1}{4}$ oz. In another experiment, 3 lbs. of galls yielded 8 oz.—*Chem. Gaz. from Archiv. der Pharm.*

New Test for Prussic Acid.—The following new method of testing for hydrocyanic acid is proposed by Mr. Richard Austin, jr., of this city. The precipitate of cyanide of silver, say $\frac{1}{2}$ gr., obtained in the usual manner, is mixed with a small quantity of oxide of iron and carbonate of potash, and the whole fused together in an iron or platinum capsule. The fused mass is then dissolved in $\frac{1}{2}$ oz. of distilled water, filtered, and rendered slightly acid by the addition of a few drops of hydrochloric acid. The liquid thus treated is next divided into two portions, to one of which a few drops of a solution of sulphate of copper is added, which immediately causes the evolution of the chocolate brown colour, so characteristic of the ferrocyanide of copper; and to the other a few drops of the muriate tincture of iron, or any persalt of iron, when the solution becomes intensely blue by the formation of the ferrocyanide of iron, the ordinary prussian blue.

In Mr. Austin's opinion, "these two tests, with the well-known odour of prussic acid, are, *independent of all others*, sufficient to convince the medical jurist of the presence of free prussic acid." Mr. Austin adduces several arguments to show the superiority of this test over those already known to chemists, both in accuracy and facility of application, by persons not skilled in chemical manipulation.

The precipitates above mentioned are very distinctly obtained with $\frac{1}{2}$ gr. of cyanide of silver.—*Dublin Hospital Gazette.*

Method of detecting very minute Quantities of Copper in Organic Fluids. BY M. FILHOL.—A very delicate test consists, according to Virgoin, in immersing a piece of metallic iron in the fluid contained in a platinum crucible, when the copper is deposited on the platinum, and may then be dissolved with a few drops of nitric acid. The author proposes the following modification of this method:—He acidifies a large quantity of the fluid under examination in an evaporating dish, and then im-

merses in it a piece of platinum foil surrounded by a small zinc plate, when the copper is deposited on the platinum, colouring it red, and can be dissolved with a few drops of nitric acid.—*Chem. Gaz. from Jour. de Med. et de Chim. de Toulouse.*

On a new Acid in the Root of Robinia. By HUGO VON REINSCH.—

The author was induced, by the liquorice-like smell and taste of the acacia-root, to submit it to chemical examination; in the course of which he discovered a peculiar acid, *robinic acid*, which occurs in the root in combination with ammonia. The presence of this salt is readily detected, even by exhausting with boiling water only 2 drms. of the root, evaporating the filtered solution to the consistence of a syrup, and setting it aside for some time. In the course of 12 hours, a tolerable quantity of hard rhombohedrons of robiniate of ammonia, with a vitreous lustre, will be found to have separated. This salt dissolves without colour in 20—30 parts water, is void of taste and smell, and has no action on litmus-paper. The hot concentrated solution is not altered by carbonate of soda; with chloride of calcium, it yields a flocculent crystalline, and with chloride of barium a pulverulent precipitate; peracetate of iron produces a yellowish turbidness, nitrate of silver a slight opacity, protosulphate of iron a white precipitate, basic acetate of lead a white precipitate after some time, and protonitrate of mercury a flocculent white precipitate. As the acid forms with lead a soluble compound, the author combined it with protoxide of mercury, and treated this with sulphuretted hydrogen. In this way a colourless syrup was obtained, which on the addition of alcohol became converted into a mass of acicular crystals. From the smallness of the quantity, it could not be submitted to more accurate investigation. Besides the robiniate of ammonia, there also occurs in the root, sugar (no glycyrrhizine,) fat and essential oil, chlorophylle, wax, tannic acid, a yellow-colouring principle, which becomes reddish brown by alkalis, mucilage, much albumen, starch, salts, and an alkaloid, which the author has not yet succeeded in isolating.—*Ibid, from Jahrb. für Prakt. Phar.*

On the Preparation of Benzoic Acid. By DR. L. BLEY AND E. DIESEL.—

The authors found, on comparing the various methods hitherto recommended, that no one perfectly answered the purpose, and propose the following:—8 parts of coarsely-powdered benzoin are heated to boiling with 3—4 parts hydrate of lime and 80 parts water, with constant stirring. The mass, pressed between linen, is boiled again twice with a little water, and again submitted to pressure. When the liquid has become sufficiently clear, it is filtered, and is evaporated down to one-fifth; a slight excess of muriatic acid is then added to it, when the acid separates in beautiful crystals on cooling. It is purified by reso-

lution in hot distilled water, filtration and crystallization. On concentrating the liquid containing the chloride of calcium and the wash-water from the separated acid, a further quantity of slightly-coloured benzoic acid is obtained. 100 parts benzoin from Siam yielded 7 parts of pure and $1\frac{1}{2}$ part of somewhat coloured acid. Another kind gave 11 per cent. pure and 2 per cent. slightly coloured acid. A sample of *Styrax amygdaloides* yielded 13 per cent. pure and 2 per cent. impure acid. According to the experiments of the authors, the proportion of acid seems to vary in the different kinds, but the *Styrax amygdaloides* appears to contain most.—*Ibid*, from *Archiv. der Pharm.*

Observations on a New Substance brought from America. By M. GUBOURT—In the month of August last M. Leory, a pharmacist at Brussels, sent me a volatile oil, very remarkable, on account of its flowing abundantly from a vegetable, without its being necessary to have recourse to distillation to obtain it. I much regret that I have neglected this communication up to the present time. At Bogota, from whence it is brought, this oil is called *aceite of amacy*. The tree that produces it is at present unknown, but it grows abundantly in the moist virgin forests in the neighbourhood of Bogota; it contains so large a quantity of the essence, that it is sufficient to wound a branch, and suspend a vessel from it, to collect a litre in a very few minutes.

The essence is liquid, of a very pale yellow colour, not greasy to the touch, its taste is sweet at first, then hot, pungent, and bitter. Cold, a few degrees above the freezing point, does not render it solid. Its smell according to M. Leroy much resembles that of orange blossoms, but to me it appeared more like that of the rose, or rather the essence of *licari*, rosewood. M. Goudot, to whom I showed it, told me that this essence came from forests situated about seven or eight leagues from Bogota, but he was not acquainted with the tree that produced it, and that it was employed at Bogota in the adulteration of copaiba. It is, in fact, certain that the copaiba that reaches us from Maracaibo and other parts of Columbia, much resembles it in smell; this, up to the present time, has been attributed to it, solely, on the ground that it was produced by a particular species of *copabifera*.—*Chem., from Journ. de Pharm.*